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Patient Safety Culture in Irish Healthcare: A Mixed-Methods Investigation

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A thesis presented to the National University of Ireland, Cork for the degree of Doctor of Philosophy in the School of Pharmacy

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List of Abbreviations

ACSNI	Advisory Committee on the Safety of Nuclear Installations
ADE	Adverse Drug Event
ADON	Assistant Director of Nursing
ADR	Adverse Drug Reaction
AHRQ	Agency for Healthcare Research and Quality
AIDS	Acquired Immunodeficiency Syndrome
AMAU	Acute Medical Admissions Unit
BCW	Behaviour Change Wheel
CASP	Critical Appraisal Skills Programme
CHQS	Centre for Healthcare Quality and Safety
CNM	Clinical Nurse Manager
CNS	Clinical Nurse Supervisor
COREQ	COnsolidated criteria for REporting Qualitative research
CUSP	Comprehensive Unit-based Safety Programme
ENTREQ	Enhanced Transparency in Reporting the Synthesis of Qualitative research
EPHPP	Effective Public Health Practice Project
EPOC	Effective Practice and Organisation of Care
ESRC	Economic and Social Research Council
FMAQ	Flight Management Attitudes Questionnaire
FY	Foundation Year

GP	General Practitioner
GPSC	Global Patient Safety Challenge
HAPU	Hospital Acquired Pressure Ulcers
HCA	Healthcare Assistant
HCP	Healthcare Professional
HMPS	Harvard Medical Practice Study
HSCP	Health and Social Care Professional
HSE	Health Service Executive
HSOPSC	Hospital Survey on Patient Safety Culture
ICU	Intensive Care Unit
INMO	Irish Nurses and Midwives Organisation
IOM	Institute of Medicine
IPC	Interprofessional Communication
IT	Information Technology
MDT	Multidisciplinary Team
ME	Medication Error
MeSH	Medical Subject Headings
MHA	Michigan Health & Hospital Association
NCHD	Non-Consultant Hospital Doctor
OBD	Observable Bed Days
OECD	Organisation for Economic Co-operation and Development
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses

PROSPERO	International Prospective Register of Systematic Reviews
PSCHO	Patient Safety Climate in Healthcare Organisations
SAQ	Safety Attitudes Questionnaire
SBAR	Situation-Background-Assessment-Recommendation
SHO	Senior House Officer
SPSP	Scottish Patient Safety Programme
TDF	Theoretical Domains Framework
UK	United Kingdom
US	United States of America
WHO	World Health Organisation

Declaration

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism.

Laura Gleeson

October 2020

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Publications and Presentations

Peer-Reviewed Publications

- **Gleeson L**, Dalton K, O'Mahony D, Byrne S. Interventions to improve reporting of medication errors in hospitals: A systematic review and narrative synthesis. Res Soc Adm Pharm. 2020;16(8):1017–25. doi.org/10.1016/j.sapharm.2019.12.005.
- **Gleeson LL**, Tobin L, O'Brien GL, Crowley EK, Delaney A, O'Mahony D, Byrne S., Safety culture in a major accredited Irish university teaching hospital: a mixed methods study using the safety attitudes questionnaire. Ir J Med Sci. 2020 Apr 10. doi: 10.1007/s11845-020-02228-0.

Under Review in Peer-Reviewed Journals

- **Gleeson L**, O'Brien GL, O'Mahony D, Byrne S. Thirst for Change in a Challenging Environment: Healthcare Providers' Perceptions of Safety Culture in a Large Irish Teaching Hospital. Currently under review in *Journal of Interprofessional Care.*
- **Gleeson L**, O'Brien GL, O'Mahony D, Byrne S. Interprofessional Communication in the Hospital Setting – A Systematic Review of the Qualitative Literature. Currently under review in *Journal of Interprofessional Care.*

Peer-Reviewed Published Abstracts

- **Gleeson L**, Tobin L, Crowley EK, Delaney A, O'Mahony D, Byrne S. Safety Culture in a Large Acute Irish Teaching Hospital: The Safety Attitudes Questionnaire. Int J Clin Pharm. 2018;41. Available from: https://link.springer.com/article/10.1007/s11096-018-0759-9.
- **Gleeson L**, O'Brien GL, Tobin L, Crowley EK, Delaney A, O'Mahony D, *et al*. Investigating patient safety culture using the open comments section of the Safety Attitudes Questionnaire (SAQ). Int J Clin Pharm. 2019;27(S2). Available from: https://onlinelibrary.wiley.com/doi/10.1111/ijpp.12533.
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Poster Presentations

- **Gleeson L**, Tobin L, Crowley EK, Delaney A, O'Mahony D, Byrne S. Safety Culture in a Large Acute Irish Teaching Hospital: The Safety Attitudes Questionnaire. Presented at European Society of Clinical Pharmacy Symposium on Clinical Pharmacy, Belfast, October 2018.
- **Gleeson L**, O'Brien GL, Tobin L, Crowley EK, Delaney A, O'Mahony D, *et al*. Investigating patient safety culture using the open comments section of the Safety Attitudes Questionnaire (SAQ). Presented at Health Services Research and Pharmacy Practice conference, Birmingham, April 2019.

- **Gleeson L**, Dalton K, O'Mahony D, Byrne S. Interventions to Improve Medication Error Reporting in Hospitals: A Systematic Review and Narrative Synthesis. Presented at Prescribing and Research in Medicines Management conference, Manchester, January 2020.

Thesis Abstract

Introduction

Medical error is a leading cause of preventable harm worldwide. Patient safety culture has been described as the way in which members of a healthcare organisation think about and prioritise safety. The patient safety culture in a healthcare organisation can be affected by numerous factors including staff perceptions of teamwork, patient safety, working conditions and support from management in their clinical area. A positive patient safety culture has been reported to have a positive impact on patient safety. Various instruments have been used to measure patient safety culture in healthcare organisations around the world over the past two decades, however there is a lack of research on the patient safety culture in Irish healthcare organisations. Over the past decade, the Irish healthcare system has suffered from the after effects of the global financial crisis and historic underfunding, which has led to understaffing and overcrowding in hospitals. The aim of this thesis was to investigate the patient safety culture in Ireland and to explore methods to improve patient safety in Irish healthcare organisations.

Methods

A mixed-methods approach was adopted throughout this thesis. First, a mixed-methods survey study using the Safety Attitudes Questionnaire was carried out to investigate the safety culture in a number of healthcare organisations in the south-west of Ireland. The study involved quantitative analysis of survey results as well as qualitative analysis of data gathered in the comments section of the survey. The

results of this mixed methods study informed the development of the topic guide for a qualitative interview study, which aimed to further explore staff perceptions of the safety culture in a large Irish teaching hospital. The results of the survey and interview studies led to the conduction of two systematic reviews: 1) a quantitative systematic review on interventions to improve medication error reporting in hospitals, and 2) a qualitative systematic review on healthcare professionals' experiences of interprofessional communication.

Results

The mixed methods survey study and qualitative interview study found that Irish healthcare professionals generally have positive attitudes towards the patient safety culture in their clinical area. A number of potential areas for improvement were identified including working conditions, interprofessional communication, education, support from management and medication error reporting. The quantitative systematic review on medication incident reporting identified a lack of intervention studies of strong methodological quality. Anonymity, reporting system format, education and a non-punitive culture were identified as important factors to consider when designing an intervention to improve medication error reporting. The qualitative systematic review on interprofessional communication found that personal factors, such as strong working relationships and an interprofessional ethos can act as facilitators, while organisational factors such as hierarchy and stressful working conditions can act as barriers to interprofessional communication.

Conclusions

This thesis has made a significant contribution to patient safety research and to the knowledge available regarding patient safety culture in Irish healthcare. This thesis makes three novel contributions to the literature on patient safety:

1) An insight into safety culture in Irish healthcare organisations,
2) A novel systematic review of interventions to improve medication incident reporting and
3) A novel systematic review of healthcare professionals' experiences of interprofessional communication.

This thesis therefore lays the groundwork for two future studies to improve patient safety in Irish healthcare organisations, and should therefore be used as a guide for future patient safety research.

Chapter 1 : Introduction

1.1 Background

1.1.1 Patient Safety

From the early Greek healers in the 4th century BC, to Florence Nightingale in the 19th century, to present day medical, nursing and other health and social care students, a central tenet of patient care has always been to *'do no harm'*.[1,2] Since the mid-19th century, however, it has become clear that medical care is associated with a substantial level of harm, sometimes leading to significant injury and death.[3–7] In 1964, Schimmel *et al*. found that 20% of patients in a university hospital in the United States of America (US) suffered one or more *'episodes of medical complications'* during their hospital stay.[8] The Harvard Medical Practice Study (HMPS), carried out in 1984, involved the review of more than 31,000 medical records. It found that an adverse event, defined as *'an injury that was caused by medical management (rather than the underlying disease) and that prolonged the hospitalization, produced a disability at the time of discharge, or both'* occurred in nearly 3.7% of the patients studied. Of the identified adverse events, 27.6% were reported to be due to negligence.[4] However, in a 1993 paper titled '*Preventing Medical Injury'*, Lucian L. Leape, an American physician and co-author of the HMPS, proposed that *'most errors, though preventable, cannot fairly be attributed to negligence'*.[9] Leape *et al.* found that 69.6% of the adverse events reported in the HMPS were preventable, of which 27.6% were due to negligence and 42% were caused by preventable, but non-negligent, errors. Similarly, the Quality in Australian Health Care Study, published in 1995, found that 16.6% of reviewed admissions were associated with an adverse event, 51% of which were considered preventable.[5] These two studies were among the first to recognise both the extent of the impact of medical error on patient

outcomes, and also the fact that not all medical errors are due to negligence. As stated by Leape *et al*., '*Although doctors and nurses are arguably among the most careful people in our society, they do make mistakes'*.[9]

During the 1990's it became clear that, with the increasing complexity of modern medicine, healthcare is associated with a significant level of avoidable patient harm. It was during this period that patient safety, defined by the World Health Organisation (WHO) as *'the absence of preventable harm to a patient during the process of health care and reduction of risk of unnecessary harm associated with health care to an acceptable minimum',* became a major focus in medical research.[10] In a 1994 article entitled '*Error in Medicine*', Leape sought to explain the high rate of medical errors and to explore ways to prevent such errors. He discussed how the culture of medical practice was putting pressure on doctors and nurses to practice perfectly and without error, leading healthcare professionals (HCPs) to view errors as personal failures which should be associated with a sense of shame or embarrassment.[11] A 1991 study by Wu *et al.* encapsulated the negative safety culture that existed in medicine at the time, reporting that only 54% of house officers surveyed discussed errors with their supervising physicians.[12] The key message of '*Error in Medicine'* was the need for a change in medical culture, so that HCPs could recognise errors as the result of systems failures rather than personal flaws, and feel supported to discuss the errors and work towards systemic solutions to prevent their recurrence.[11]

The publication of the landmark report '*To Err is Human'*, by the US Institute of Medicine (IOM) in 1999, placed patient safety firmly as a central focus of modern healthcare. The report, which defined safety as '*freedom from accidental injury'*, outlined the impact, both in terms of patient outcomes and economic cost, of medical errors in the US. By extrapolating data from the HMPS, it estimated that up to 98,000 Americans died each year as a result of medical injury. This would mean that more people died in the US each year from medical error than from motor vehicle accidents, breast cancer or acquired immunodeficiency syndrome (AIDS).[3] More recent studies have shown this figure to be an under-estimation, indicating that medical error may be responsible for up to 400,000 deaths in the US each year.[13,14] A 2016 paper estimated medical error to be the 3rd leading cause of death in the US.[6] Nonetheless, two of the IOM report's key recommendations, to improve reporting of errors in order to improve healthcare systems and to implement safe practices throughout healthcare organisations, have had a significant impact on the way patient safety is studied around the world.[3] In the two decades since the report was published, the successful implementation of a positive patient safety culture has become a key goal for healthcare organisations worldwide.[15]

1.1.2 Safety Culture

The concept of safety culture first became popular after the Chernobyl nuclear disaster in 1986, when it was suggested in the nuclear power industry that accidents and safety incidents could be avoided by having a '*positive safety culture*'.[16] In the late 1980's, safety culture was described as '*the set of beliefs, norms, attitudes, roles,*

and social and technical practices that are concerned with minimizing the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious'.[17] In 1993, the United Kingdom (UK) Advisory Committee on the Safety of Nuclear Installations (ACSNI) stated that an organisation with a positive safety culture is characterised by mutual trust, shared recognition of the importance of safety and confidence in preventative measures.[18]

The idea of organisational safety culture was soon applied in the aviation industry. Like nuclear energy, aviation is a high-pressure, high-risk industry in which even a slight drop in performance levels and safety standards can have fatal consequences.[19] Safety has been ingrained in aviation since the industry began in the early 20th century; high pilot death rates in the first two decades of aviation led to unionisation and pilots' insistence that they would not fly against their better judgement.[20] Since then, both aircraft and aviation systems have been designed with the assumption that some degree of error is inevitable and that safeguards must be put in place to minimise the effect of errors that do occur.[11] Crew resource management, which has been defined as '*using all available resources – information, equipment and people – to achieve safe and efficient flight operations*', has been used in the aviation industry since the 1980's.[21,22]

In 1993, Westrum used examples from engineering to develop three levels of organisational culture: 1) pathological, don't want to know about risk; 2) bureaucratic, will do something about risks if they occur; and 3) generative, actively

working to manage risk.[23] These levels were adapted by Parker and Hudson for application to the oil and gas industry, and the resulting levels of organisational safety culture, described in **Table 1.1,** have been applied extensively in healthcare quality and safety research.[24–26]

Table 1.1: Levels of Organisational Safety Culture [26]

Level of Organisational Safety Culture	**Definition**
Level 1: Pathological	Why should we waste our time on risk management and safety issues?
Level 2: Reactive	We take risk seriously and do something every time we have an incident
Level 3: Calculative	We have systems in place to manage all likely risks
Level 4: Proactive	We are always on the alert, thinking of risks that might emerge
Level 5: Generative	Risk management is an integral part of everything we do

James Reason's article, '*Human error: models and management'*, published in 2000, looked at the ways in which errors were dealt with in organisations such as the nuclear and aviation industries to examine how they could be applied to health care.[27] Reason put forward two models of error causation: the '*person approach'* and the '*systems approach'*. The person approach focuses on the individual who committed the error, blaming them for forgetfulness, weakness or negligence. The systems approach is based on the idea that humans are fallible, and errors are inevitable, so systems must be designed with defensive layers in place to prevent errors occurring. Reason also described the '*Swiss Cheese Model'* of accidents,

displayed in **Figure 1.1**, in which each defensive layer has many holes which are constantly shifting around, and when the holes in each defensive layer momentarily line up, errors which can occur, resulting in patient harm.[27]

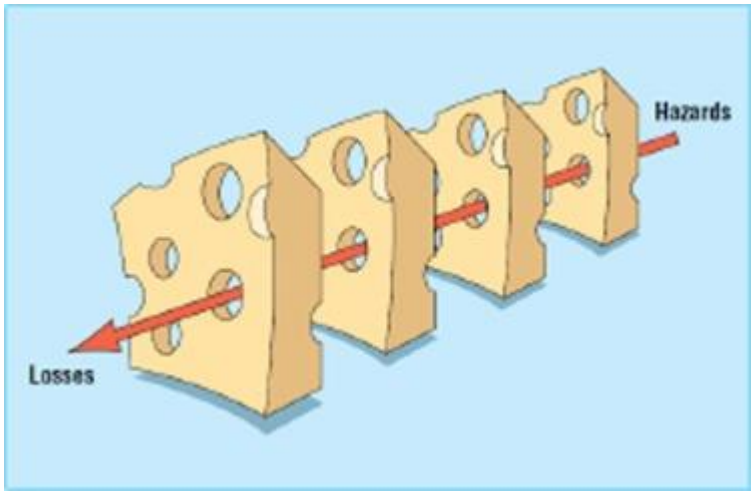

Figure 1.1: Reason's Swiss Cheese Model [27]

Reason also discussed the importance of organisational culture in high-risk industries such as nuclear power, aviation and medicine. He described how the culture of a high-reliability organisation provides the tools for individuals to remain alert to safety hazards, and focuses on making systems robust enough to withstand both human and technical safety hazards.[27]

The concept of safety culture is now commonly used in healthcare organisations around the world to measure commitment to safety and to identify areas for improvement.[28–31] Although no widely agreed definition for safety culture exists, a commonly cited definition is that put forward by the ACSNI in 1993: '*the product of*

individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety management'.[18]

The terms '*safety culture'* and '*safety climate'* are often used interchangeably in the literature, however they have distinct definitions.[32] Safety culture is a broad term which *'encompasses the norms, values and basic assumptions of an entire organisation*'. Safety climate is a more specific term which '*refers to the employees' perceptions of particular aspects of the organisation's culture*'.[33] Because these definitions are not used consistently in the literature, and no concrete definition of either exists, for the purposes of this thesis the term *'safety culture*' will be used to refer to both '*safety culture'* and '*safety climate'*, unless otherwise stated.[32,34,35]

1.1.3 Measuring Safety Culture

Over the past two decades, numerous tools have been developed to measure safety culture and safety climate. A 2011 evidence scan identified 24 tools to assess safety culture.[32]

The Hospital Survey on Patient Safety Culture (HSOPSC) was designed by the US Agency for Healthcare Research and Quality (AHRQ) to investigate the opinions of hospital staff about the patient safety culture in their place of work.[36] The survey

consists of 42 items which are grouped into 12 '*composite measures'* or composites.

The 12 composites and their definitions are outlined in **Table 1.2**.

Table 1.2: HSOPSC composite measure titles, definitions, and number of survey items [37]

Patient Safety Culture Composite	**Definition**	**No. of Survey Items**
Communication Openness	Staff will freely speak up if they see something that may negatively affect patient care, and feel free to question those with more authority	3
Feedback & Communication about Error	Staff are informed about errors that happen, given feedback about changes put into place based on event reports, and discuss ways to prevent errors	3
Frequency of Events Reported	Mistakes of the following types are reported: 1) mistakes caught and corrected before affecting the patient, 2) mistakes with no potential to harm the patient, and 3) mistakes that could harm the patient, but do not	3
Handoffs & Transitions	Important patient care information is transferred across hospital units and during shift changes	4
Management Support for Patient Safety	Hospital management provides a work climate that promotes patient safety and shows that patient safety is a top priority	3
Non-punitive Response to Error	Staff feel that their mistakes are not held against them, and mistakes are not kept in their personnel file	3
Organisational Learning – Continuous Improvement	Mistakes have led to positive changes and changes are evaluated for their effectiveness	3
Overall Perceptions of Patient Safety	Procedures and systems are good at preventing errors and there is a lack of patient safety problems	4
Staffing	There are enough staff to handle the workload and work hours are appropriate to provide the best care for patients	4

Patient Safety Culture Composite	Definition	No. of Survey Items
Supervisor/Manager Expectations & Actions Promoting Safety	Supervisors/managers consider staff suggestions for improving patient safety, praise staff for following patient safety procedures, and do not overlook patient safety problems	4
Teamwork across Units	Hospital units cooperate and coordinate with one another to provide the best care for patients	4
Teamwork within Units	Staff support one another, treat each other with respect, and work together as a team	4

The survey has been widely used in the US and other countries including Belgium, Norway, Saudi Arabia, Lebanon and France.[28,32,38–41] The survey has also been used to compare safety culture between countries and industries.[42,43] A potential weakness of the survey is that it is focused on the hospital context, however it has also been adapted for use in the nursing home setting.[32,44]

The Safety Attitudes Questionnaire (SAQ) was derived from the Flight Management Attitudes Questionnaire (FMAQ). The FMAQ was developed by researchers at the University of Texas to measure aviation crew member attitudes about interpersonal aspects of crew performance such as teamwork and speaking up, when it was identified that breakdowns in these areas could lead to accidents.[45,46] Development of the SAQ involved retention of approximately 25% of the FMAQ items that were applicable to a medical setting, and generating new items through discussion with HCPs and subject matter experts.[45] The resulting survey consists of 60 Likert-scaled items that measure the participant's attitude towards 6 domains of safety culture. A

short-form version of the survey, which measures the 6 domains over 32 items, has been widely used since 2006 (**Appendix 1**).[29,47] The 6 domains and their definitions are described in **Table 1.3**. The survey also contains an open-ended comments section in which participants are asked *'What are your top three recommendations for improving patient safety in your clinical area?'*, and a *'Communication and Collaboration*' section in which participants are asked to rate the quality of their interactions within their discipline and with other healthcare disciplines.[45]

Table 1.3: SAQ Short Form domain titles, definitions and number of survey items[45,47]

Safety Culture Domain	**Definition**	**Number of Survey Items (Short Form 2006)**
Teamwork Climate	Perceived quality of collaboration between personnel	7
Safety Climate	Perceptions of a strong and proactive commitment to safety	7
Perceptions of Management	Approval of managerial action	5
Job Satisfaction	Positivity about the work experience	5
Working Conditions	Perceived quality of the work environment and logistical support (staffing, equipment, etc.)	4
Stress Recognition	Acknowledgement of how performance is affected by stressors	4

The SAQ has been widely used and validated in many countries and languages, including Italy, Albania, China and Ireland.[29,30,48,49] It has been adapted for use in a variety of settings, including intensive care, primary care, labour and delivery units, and operating rooms.[32,50–52]

The Patient Safety Climate in Healthcare Organisations (PSCHO) tool, was developed by researchers at Stanford University. Research on other high-risk organisations, and a review of existing safety culture tools, led to the identification of 16 characteristics of safety climate. The original version of the tools contains 38 Likert-scaled items, which measure safety climate at three levels: organisational, unit-level and interpersonal. Safety climate at each organisational level is measured over a number of subscales, detailed in **Table 1.4**.[53]

Table 1.4: PSCHO Levels and Subscales [54]

Level	**Subscales**
Organisation	Senior Manager's Engagement
	Organisational Resources for Safety
	Overall Emphasis on Patient Safety
Unit	Unit Manager's Support
	Unit Safety Norms
	Unit Recognition and Support for Safety Efforts
	Collective Learning
	Psychological Safety
	Problem Responsiveness
Interpersonal	Fear of Shame
	Fear of Blame/Punishment

To improve response rates, a short-form version of the survey was developed, consisting of 15 items which measure safety climate over 3 broad scales: overall

organisation, immediate work unit, and interpersonal concerns.[54] The PSCHO has not been widely used outside of the US.[32]

The Manchester Patient Safety Assessment Framework (MaPSAF) was developed by researchers at the University of Manchester to measure safety culture in primary care in the UK. The theoretical underpinning of the MaPSAF is based on the levels of organisational safety culture described in **Table 1.1**.[26] The original MaPSAF measures safety culture across 9 domains of safety culture, which are outlined in **Table 1.5**. The MaPSAF asks participants to use the five levels of organisational safety culture to rate their organisation in each of the 9 domains.[26,32] It has also been adapted for use in community pharmacies.[25] Although the MaPSAF has been widely used in healthcare organisations in the UK, it has not been widely validated in other countries.[32]

Table 1.5: MaPSAF Dimensions of Safety Culture [26]

No.	Dimension of Safety Culture
1	Overall commitment to quality
2	Priority given to patient safety
3	Perceptions of the causes of patient safety incidents and their identification
4	Investigating patient safety incidents
5	Organizational learning following a patient safety incident
6	Communication about safety issues
7	Personnel management and safety issues
8	Staff education and training about safety issues
9	Team working around safety issues

Although a large number of tools have been developed to measure safety culture, the most widely used tools are the HSOPSC and the SAQ.[32,37,45]

1.1.4 Safety Culture and Patient Outcomes

As mentioned previously, there has been a significant research focus over the past two decades on the measurement of safety culture in healthcare organisations. This research has generally been carried out with the assumption that improving safety culture will have a positive impact on patient outcomes. However, very little empirical research has been conducted to determine the relationship between safety culture and patient outcomes.[34]

In 2014, Groves published a meta-analysis that examined the relationship between safety culture and patient outcomes in the acute hospital setting. Fourteen studies met the inclusion criteria for the meta-analysis, but because of heterogeneity in the types of patient safety outcomes investigated in the identified studies, five small meta-analyses were carried out using data from ten studies. The five meta-analyses investigated the relationship between patient safety culture and the following patient outcomes: pressure ulcers, falls, medication errors (MEs), non-surgical patient outcomes and post-operative patient outcomes. All five analyses produced effect size estimates that were negligible and non-significant. Groves concluded that the assumption that patient safety culture was directly linked with patient outcomes

was not supported by the literature, although the lack of primary studies examining the relationship between safety culture and patient outcomes was acknowledged.[55]

DiCuccio conducted a systematic review, published in 2015, of research connecting patient safety culture to nurse-sensitive patient outcomes.[35] Sixteen cross-sectional descriptive studies were identified, and one qualitative study. The most frequently used safety culture measurement tools were the SAQ and the HSOPSC. The patient outcomes investigated in the identified studies were found to vary depending on the level of safety culture analysis. When safety culture was measured at a hospital level, global measures such as mortality and readmission rates were found to be significantly related to safety culture. For example, Sorra *et al*. found that higher scores in the HSOPSC were associated with higher scores on the Consumer Assessment of Healthcare Providers and Systems Hospital Survey, a survey of adult inpatients' experiences with hospital care.[56] Analysis at the nursing unit level found significant relationships between safety culture and nursing-driven outcomes such as patient and family satisfaction, and hospital acquired pressure ulcers (HAPU). Dissertations by O'Brien and Taylor concluded that positive SAQ scores were associated with lower incidence of community acquired-pneumonia and HAPU, respectively.[57,58] However, five of the identified studies had non-significant or unexpected results. DiCuccio concluded that more research, including interventional studies, was required to fully understand how patient safety culture relates to patient outcomes.[35]

Similar to the reviews carried out by Groves and DiCuccio, a 2011 research overview by the UK-based independent healthcare charity The Health Foundation, entitled '*Does improving safety culture affect patient outcomes?*', did not find evidence for a straightforward link between safety culture and patient outcomes.[34,35,55] Of the 23 studies identified in the research overview, 10 found a definite positive link, 6 found no relationship, and 7 found a potential or indirect link. The research overview also identified 27 studies that explored the relationship between safety culture and staff outcomes, of which 18 found a clear relationship, one found no relationship, and 8 found complex interlinkages. The authors concluded that while there may not have been evidence in the literature for a straightforward relationship between safety culture and patient outcomes, in which safety improvement initiatives improve culture which improves patient outcomes, it is more likely that a reciprocal relationship exists, as illustrated in **Figure 1.2**, in which safety culture and climate, improvement initiatives, and staff and patient outcomes are interlinked.[34] Also in keeping with Groves and DiCuccio, the research overview points out that most safety culture research is focussed on examining the link between improvement initiatives and safety culture, rather than the arguably more important link between safety culture and patient safety.[34,35,55]

Figure 1.2: Complex relationship between safety culture and patient outcomes[34]

It could be argued that the inconsistent findings of the reviews referenced here could be due to the fact that they were all published within 15 years of the popularisation of safety culture research.[34,35,55] A 2019 review by Lee *et al.*, however, had similarly inconclusive findings.[59] The 17 identified studies had significant methodological variability in terms of the tools used to measure safety culture, the levels at which safety culture was analysed (hospital, ward level etc.) and the patient outcomes that were investigated. Lee *et al*. concluded that future safety culture research should determine the most suitable units of analysis, data collection methods and methods statistical analysis in order to allow comparison between studies.[59]

The four reviews referenced above failed to find significant evidence for a straightforward, easily defined relationship between patient safety culture and patient outcomes. All authors noted a lack of primary or intervention-based research on the topic, and reported methodological heterogeneity between the studies that were identified. However, it is likely that a complex interrelationship exists between safety culture, improvement initiatives and patient outcomes. It is also important to note that most research studies on safety culture in healthcare organisations are carried out at a single point in time; very few are longitudinal. Safety culture is a broad term that describes the outlook of an organisation over an extended period of time and in order to examine any relationship between safety culture and patient outcomes it would be more useful to measure those variables at several time points. A longitudinal study of this manner is often not feasible for members of a healthcare organisation who are interested in improving patient safety as quickly as possible. Therefore, a more pragmatic approach to safety culture research may be to identify potential areas for change within an organisation using safety culture measurement tools.

1.1.5 Initiatives to Enhance Patient Safety

As mentioned above, the publication of '*To Err is Human*' inspired an international focus on patient safety.[3] Over the past two decades, patient safety improvement initiatives have been carried out at local and national levels around the world, utilising a range of quality improvement models and tools.

The Scottish Patient Safety Programme (SPSP), which began in 2008, was inspired by a patient safety programme at Ninewells Hospital, Dundee. That hospital succeeded in reducing patient harm, measured using the Institute for Healthcare Improvement Global Trigger Tool, by 60% in 3 years.[60] The aim of the SPSP was to reduce mortality by 15% in 5 years and to reduce adverse events, measured by the Global Trigger Tool, by 30%. The SPSP consisted of five key activities to improve patient safety. Firstly, local health boards used communication strategies and leadership walkarounds to convince hospital staff and patients that safety was a priority. Safety was contemporaneously established as a strategic priority by the Scottish National Health Service. A sustainable infrastructure for improvement was implemented, which included developing a Scottish clinical improvement faculty and training HCPs in improvement science. The focus, clinical changes, definitions and measurements of the SPSP were aligned with those of existing national programmes. Lastly, a learning system was established which consisted of biannual national meetings to discuss barriers to patient safety and their solutions, as well as monthly calls and progress reports, and site visits.[61]

The SPSP used the Model for Improvement as its core change model. As shown in **Figure 1.3**, this model consists of two parts. The first part involves defining what needs to be accomplished, what changes are needed, and what can be measured to know if a change is an improvement. The second part of the model uses the Plan-Do-Study-Act strategy to test and monitor change.[62]

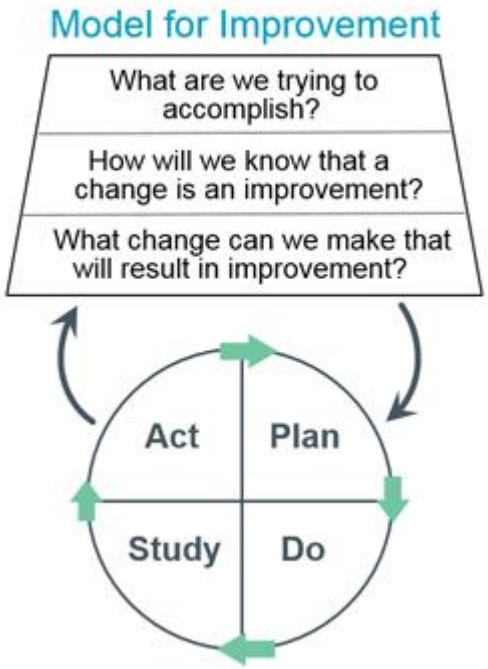

Figure 1.3: Model for Improvement[62]

By 2010, halfway through the five-year period, the national hospital standardised mortality rate had fallen by 5% and *C. difficile* infection rates had fallen by 50%. Recognising the need for continuous improvement, the SPSP is ongoing and has been extended to include the SPSP Primary Care and the Maternity and Children Quality Improvement Collaborative.[63,64]

The Michigan Health & Hospital Association (MHA) Keystone Centre for Patient Safety & Quality Obstetric Collaborative Project, carried out in 2009, aimed to promote safe care practices during labour and birth using the Comprehensive Unit-based Safety Programme (CUSP).[65] CUSP is an 8-step programme designed to

improve safety climate by empowering staff to take responsibility for safety in their work environment. The eight steps involved in CUSP are listed in **Table 1.6**.[66]

Table 1.6: CUSP Steps[66]

CUSP Step	Description
1	Conduct an assessment of the culture of safety
2	Educate staff about safety
3	Identify staff safety concerns
4	A senior executive '*adopts*' a unit and discusses safety with the unit team on a monthly basis
5	Implement improvements
6	Document results
7	Share results
8	Reassess safety culture

CUSP had previously been used in an MHA collaborative project to improve safety in intensive care units (ICUs), and was associated with a significant decrease in hospital-based mortality in Michigan compared with the surrounding area.[67] Pre-intervention and post-intervention assessments of safety culture using the SAQ revealed that the Obstetric Collaborative Project was associated with improvements in the domains working conditions, job satisfaction and perceptions of management. Significant improvements were also reported in perinatal patient safety infrastructure components and care processes.[65]

The Model for Improvement and CUSP have been shown to be effective quality improvement tools with the potential to improve patient safety in a variety of care settings.[62,66] However, the most ambitious and wide-ranging patient safety initiatives launched over the past two decades have been the WHO patient safety challenges. In 2004, at the 57th meeting of the World Health Assembly, the World Alliance for Patient Safety was launched. A core focus of the alliance was to formulate a Global Patient Safety Challenge (GPSC), related to a topic that poses significant risk to patients and relevant to every WHO member state. Three GPSC initiatives have been launched to date.

The first GPSC, '*Clean Care is Safer Care'*, focussed on healthcare associated infection and one key action: improving hand hygiene in healthcare, which was published in 2009.[68] The challenge had four key goals: 1) to raise worldwide awareness of the impact of healthcare associated infections, 2) to build commitment from other countries, 3) to provide and implement recommendations for the promotion of hand hygiene in healthcare and 4) to test this implementation at specific sites.[69]

The second GPSC, '*Safe Surgery Saves Lives'*, was launched in 2009. It aimed to improve surgical safety and reduce the number of surgical deaths by 1) sharing information on the role and patterns of surgical safety in public health, 2) defining a set of measures for surveillance of surgical care, 3) identifying a '*surgical safety*

checklist' for use in operating rooms and 4) testing and disseminating the checklist and surveillance measures worldwide.[70] The Surgical Safety Checklist was implemented in eight hospitals in eight countries and was associated with a significant reduction in surgical mortality and inpatient complications.[71]

The third GPSC, '*Medication Without Harm*', launched in 2017, aims to reduce the worldwide level of severe, avoidable harm related to medications by 50% over 5 years.[72] The challenge is divided into three sections. First, countries are asked to focus on three priority areas: 1) high-risk situations, 2) polypharmacy, and 3) transitions of care. Countries are then asked to design specific programmes of action to improve patient safety in four domains: 1) health care professionals' behaviour, 2) systems and practices of medication delivery, 3) medicines, and 4) patients and the public. Finally, the WHO will pursue successful outcomes in a wide range of areas, including monitoring and evaluating the impact of the challenge and empowering patients to safely manage their own medications.[73]

Although the patient safety strategies referenced here differ in terms of their focus and aims, there are important similarities in the strategies designed to achieve these aims. They all subdivide their primary aim into smaller, more achievable goals. They also all seek to educate members of the healthcare organisation, or implement clear guidelines, on how to achieve these goals. And finally, they all recognise the importance of obtaining buy-in from frontline healthcare staff as well as from

executive members of the organisation. Ultimately, it could be said that each patient safety initiative referenced here, whether it is stated explicitly or not, aims to '*improve the way patient safety is thought about and implemented within a healthcare organisation and the structures and processes in place to support this*', in short, to improve the organisation's patient safety culture.[32]

1.1.6 Patient Safety in the Irish Health System

Despite the global focus on patient safety over the past two decades, there is a lack of published research on safety culture in Irish healthcare. In 2009, Relihan *et al.* published a study in which the SAQ was used to measure the safety culture in the Acute Medical Admissions Unit of St James' Hospital, Dublin. Study participants scored significantly higher than the international benchmark in the domains '*Teamwork Climate*', '*Safety Climate*', '*Stress Recognition*', and '*Job Satisfaction*', while attitudes towards the domains '*Perceptions of Management*' and '*Working Conditions*' were more negative. Staff highlighted communication, equipment and facilities as safety concerns.[30] A 2018 study by Dwyer *et al*. used the SAQ to investigate the safety culture in a neonatal unit in the Rotunda Hospital, Dublin; the domain with the lowest mean score was '*Perceptions of Management*'.[74] To date, however, safety culture has not been measured at an organisational level in Ireland.

Due to poor reporting rates, it is very difficult to estimate the rate of medication errors that occur in Irish healthcare organisations. According to a report by the State

Claims Agency, 5,505 medication incidents were reported across 50 acute hospitals in Ireland in 2016. However, when estimated error rates are applied to the number of patient interactions occurring daily in Irish hospitals, it is clear that this figure represents significant under-reporting of medication incidents. The report concluded that there is much work to be done to improve the reporting of medication incidents in Irish hospitals.[75]

Similarly, the literature on the nature and incidence of adverse events in Irish healthcare organisations is limited. A retrospective record review study published by Rafter *et al.* in 2016 found an incidence of 10.3 adverse events per 100 hospital admissions, 70% of which were considered preventable. The authors noted that this incidence falls at the upper end of international studies, and also highlighted that there appeared to be a significant under-reporting of adverse events in the Irish healthcare system.[7]

While there is a lack of published literature on patient safety in Ireland, a number of recent publications have highlighted the challenging working conditions faced by Irish HCPs. In 2017, Humphries *et al*. have described the culture of medical migration in the country and how Irish doctors abroad are reluctant to return home due to the conditions in Irish hospitals.[76,77] In 2019, Hayes *et al*. found that one third of Irish doctors experience burnout due to a sub-optimal working environment.[78] Despite spending the fifth highest amount on healthcare in the world, Ireland has a relative

shortage of doctors per 1,000 population compared to other OECD countries (3.0 vs 3.5 in 2017), and is one of only four countries in the OECD that has seen the nursing numbers decrease in recent years, from 13.6 per 1,000 population in 2008 to 12.2 per 1,000 population in 2017.[79,80]

There are legal underpinnings for patient safety in the Irish healthcare system. The Code of Conduct of the Pharmaceutical Society of Ireland states that pharmacists must make the '*health, wellbeing and safety*' of patients their primary focus.[2] The Pharmacy Act 2007 defines professional misconduct as, among other things, '*a breach of the code of conduct for registered pharmacists*'.[81] Similarly, the Health and Social Care Professionals Act 2005 and the Nurses and Midwives Act 2011 require members of those professions to abide by codes of conduct which have patient safety as a core value.[82,83] In addition, the Safety, Health and Welfare at Work Act 2005 provides for the safety of persons at work, including the safety of healthcare professionals.[84]

1.2 Thesis Hypothesis, Aims and Objectives

1.2.1 Hypothesis

The thesis hypothesis was that the measurement of patient safety culture in a healthcare organisation can effectively highlight areas of that organisation that require further attention in order to improve the safety and clinical outcomes of patients utilizing the services of that organisation.

1.2.2 Aim

The overall aim of this thesis was to investigate patient safety culture in different Irish healthcare organisations and to explore potential methods to improve patient safety in Irish healthcare in general.

1.2.3 Objectives

To achieve this aim, the following specific objectives were identified:

- To use quantitative and qualitative methods to investigate the patient safety culture in Irish healthcare organisations and to identify areas in which patient safety can be improved (**Chapters 2**, **3** and **4**).
- To identify potential methods to improve patient safety culture in Irish healthcare organisations (**Chapters 5** and **6**).

1.2.4 Impact of COVID-19

One of the original objectives of this thesis was to design an intervention to improve patient safety in Irish healthcare. After the completion of the systematic review in **Chapter 5**, a study was designed to develop an intervention to improve ME reporting in Irish maternity services. This setting was chosen because the study was to be funded by an interdisciplinary seed grant which was awarded to UCC School of Pharmacy and Cork University Maternity Hospital. Unfortunately, due to the coronavirus pandemic, that study was postponed and could not be completed in time for inclusion in this thesis. The systematic review in **Chapter 6** was then carried out in order to explore a second potential method to improve patient safety in Irish healthcare.

1.3 Methodological Justification

A mixed methods approach, involving quantitative and qualitative data collection and analysis, was chosen for this research. A mixed-methods approach to clinical research has been shown to give a more accurate representation of participant experiences, and to better address complex health research questions than when either quantitative or qualitative research methods are used alone.[85,86] The mixed methods approach is also aligned with the pragmatic research paradigm that was adopted for this thesis. This paradigm, which states that the most suitable and appropriate research methods should be used to answer a research question, has become more accepted in healthcare research in recent years, as opposed to the positivist (quantitative) or constructivist (qualitative) approaches to research in isolation.[87]

The mixed methods approach was also particularly suitable for this research due to the complex nature of safety culture. Historically, safety culture research has been largely quantitative and survey based.[45,88] However, it has been acknowledged that qualitative research methods can provide a better understanding of the underlying cultural values of an organisation, thereby complementing the data obtained from quantitative cultural surveys.[37]

1.4 Thesis Outline

This thesis contains five original research chapters which, when combined, provide a detailed investigation into the safety culture of Irish healthcare organisations and potential methods to improve patient safety in Irish healthcare. Figure 1.4 provides an overview of this thesis and outlines how the thesis objectives are met by the individual studies undertaken and described in detail in the relevant chapters. A brief outline for each of the remaining chapters in the thesis is as follows:

Chapter 2: Quantitative results of a mixed methods investigation into the safety culture in Irish healthcare organisations using the SAQ.

Chapter 3: Qualitative results of a mixed methods investigation into the safety culture in Irish healthcare organisations using the SAQ.

Chapter 4: Qualitative interview study investigating HCPs' perceptions of the safety culture in an Irish teaching hospital.

Chapter 5: Systematic review and narrative synthesis of interventions to improve ME reporting in the hospital setting.

Chapter 6: Systematic review and thematic synthesis of the qualitative literature on HCP's perceptions of interprofessional communication (IPC) in the hospital setting.

Chapter 7: An overview discussion of the research, recommendations for future research and the final conclusions of the body of work described in the thesis.

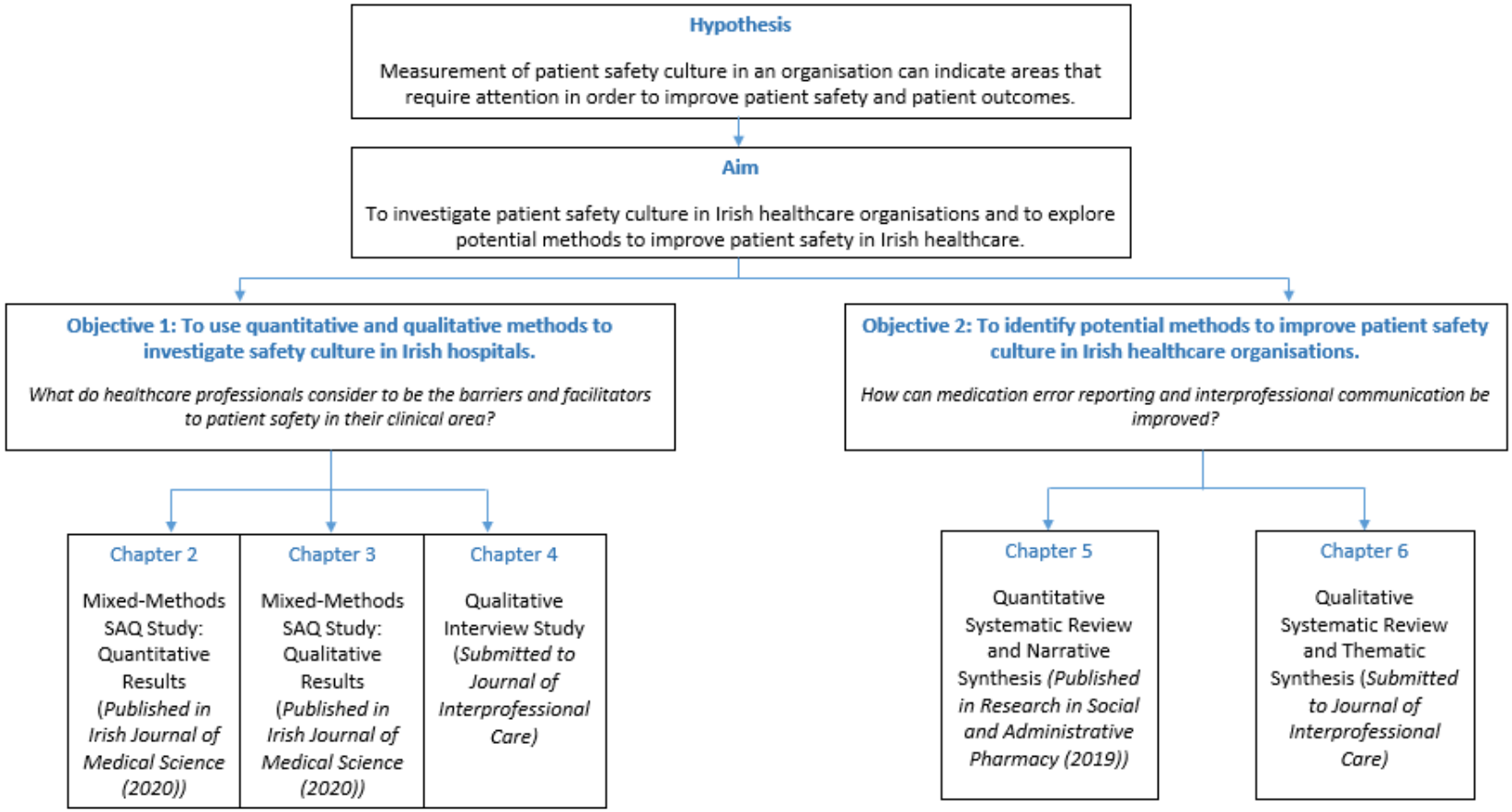

Figure 1.4: Thesis Overview

Chapter 2 : Healthcare Provider's Perceptions of Patient Safety Culture in the South-West of Ireland: Quantitative Results of a Mixed-Methods Study

Publication:

The work presented in this chapter and the subsequent chapter has been published in the following peer reviewed paper:

Gleeson LL, Tobin L, O'Brien GL, Crowley EK, Delaney A, O'Mahony D, Byrne S., Safety culture in a major accredited Irish university teaching hospital: a mixed methods study using the safety attitudes questionnaire. Ir J Med Sci. 2020 Apr 10. doi: 10.1007/s11845-020-02228-0.

2.1 Abstract

2.1.1 Aim

Patient safety culture, which is the way in which members of a healthcare organisation think about and prioritise safety, has been linked to positive patient outcomes. The aim of this study was to use the SAQ, a validated and widely used survey instrument, to measure the safety culture in a variety of healthcare settings located in the south-west of Ireland.

2.1.2 Methods

The SAQ was applied in six healthcare settings, ranging from a community healthcare organisation to a large university teaching hospital, in the south-west of Ireland between December 2017 and November 2019. The attitudes of healthcare providers towards six domains of safety culture were assessed over 32 Likert-scaled items. The mean, median, interquartile range and percent positive scores for each domain were calculated for the study population, and subgroup analyses were carried out between study sites and professions. Chi-Squared tests were used to determine whether study site or profession were related to positive domain scores. Reliability analysis was carried out using Cronbach's alpha.

2.1.3 Results

Study participants were found to have positive attitudes towards patient safety culture, but scored poorly in the domains *Working Conditions* and *Perceptions of Management*. Perceptions of safety culture were more positive in smaller healthcare

settings, and amongst nurses and healthcare assistants (HCAs). The survey had good internal consistency.

2.1.4 Conclusion

This baseline assessment revealed a generally positive safety culture in Irish healthcare. The findings reported here will form the basis for the qualitative investigations that will be described in the next two chapters.

2.2 Introduction

It is estimated that 1 in 10 patients in high income countries are inadvertently harmed when receiving hospital care.[89] In low and middle income countries 134 million adverse events occur in hospitals each year, resulting in 2.6 million deaths.[90] The WHO has defined patient safety as efforts to minimize preventable harm to a patient during their interaction with health-care services.[91] International interest in patient safety has been increasing over the past two decades, since the publication of the landmark IOM report, '*To Err is Human'*, in 1999.[3] The World Alliance for Patient Safety was launched in 2004, and the WHO has since launched three Global Patient Safety Challenges: *'Clean Care is Safer Care*' (2005), *'Safe Surgery Saves Lives*' (2008), and most recently, *'Medication without Harm*' (2017).[91]

Safety culture refers to the way safety is thought about and implemented within an organisation.[32] Patient safety culture, defined as *'the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's health and safety management'*, has been used worldwide to describe healthcare organisations' commitment to patient safety.[29,36,41,92] Several tools to measure patient safety culture have been developed over recent years, the most widely used of which are the HSOPSC and the SAQ.[36,45] Positive results in the SAQ are associated with positive patient outcomes such as reduced rates of HAPU, hospital acquired pneumonia and medical errors.[35,93]

Historic underfunding and the after-effects of the 2008 global financial crisis placed major strain on the Irish healthcare system.[79] There is a high prevalence of burnout amongst Irish healthcare providers, and large-scale outward migration of doctors since the financial crisis has been largely attributed to poor working conditions in Irish hospitals.[76,77,94,95] ME reporting rates are thought to be much lower than the actual number of MEs occurring in Irish hospitals each year.[75] The SAQ has been used previously to measure the safety culture in the acute medical admissions unit (AMAU) of an Irish hospital.[30] To date, however, safety culture has not been measured on a hospital-wide scale in Ireland.

The primary aim of this study was to investigate the perceptions of healthcare providers of the safety culture in Irish healthcare organisations. A secondary objective was to identify possible methods to improve patient safety by preventing the occurrence of MEs. This was a mixed-methods study, the quantitative results of which are presented in this chapter.

2.3 Methods

2.3.1 Study Design and Setting

This quantitative survey study was carried out as part of a mixed methods study which aimed to investigate the safety culture in various healthcare organisations in the south-west of Ireland. The short-form version of the SAQ was distributed to all staff in six study sites at various times between December 2017 and November 2019 (**Appendix 1**).[45] A combination of hard copies and an electronic version of the survey was distributed. The study was carried out in the following six settings:

- one community healthcare organisation (site A)
- one psychiatric hospital (site B)
- one large public voluntary hospital (site C)
- one small public voluntary hospital (site D)
- one maternity hospital (site E)
- one large university teaching hospital (site F).

Ethical approval for the study was granted by the local research ethics committee prior to study commencement (**Appendix 2**).

2.3.2 Questionnaire

The short-form version of the SAQ is a 32-item, Likert-scaled questionnaire which is used to measure caregivers' attitudes towards safety culture across six domains: *Safety Climate*, *Teamwork Climate*, *Job Satisfaction*, *Stress Recognition, Perceptions of Management* and *Working Conditions* (**Appendix 1**).[45] The SAQ is one of the most

widely used and rigorously validated surveys tools used to measure safety culture. In addition to its validity, the SAQ was used in this study because of the availability of international benchmarking data for comparison with the survey.[45] Before distribution, the survey was adapted to suit the Irish healthcare setting, for example by replacing the word 'attending' with the word 'consultant'. The survey was also occasionally adapted between settings, for example by replacing the word 'hospital' with the word 'service' in site E. Due to an administrative error, respondents from site C did not complete any of the questions in the domain *Teamwork Climate*. Permission to use the short form of the SAQ was received from the Centre for Healthcare Quality and Safety (CHQS), University of Texas, prior to survey adaptation (**Appendix 3**).[96]

2.3.3 Data Analysis

Questionnaire results were analysed using SPSS® version 24.[97] Responses were coded as follows: '*Strongly Disagree'* = 1, '*Disagree Slightly'* = 2, '*Neutral'* = 3, '*Agree Slightly'* = 4, '*Agree Strongly'* = 5, '*Not Applicable'*=6. As questions 2, 11, and 32 in the survey were negatively worded, the scores for these questions were reversed.[45] To maintain consistency with previous research, the following formula was used to calculate respondents' scores for each domain:

*Domain Scale Score for a Respondent = (((Mean of domain items)-1) * 25)*

The mean, median and interquartile range of the domain scores for the sample population were calculated. The median was calculated because the scale scores for the domains *Teamwork Climate*, *Safety Climate*, *Job Satisfaction,* and *Stress Recognition* were not normally distributed, however the mean score for each domain was also included to allow comparison to other studies and to the international benchmark.[30] The percent positive score, i.e. the percentage of the sample who responded positively to each domain, was found by calculating the percent of respondents who received a scale score of 75 or higher. Subgroup analyses were carried out to determine whether domain scores differed between study sites or professions. The percentage of study participants who responded '*Strongly Disagree'*, '*Slightly Disagree'*, '*Neutral'*, '*Slightly Agree'*, '*Strongly Agree'* and who did not respond to each individual statement was also calculated. Chi-Squared tests were used to determine whether study site or profession were related to positive domain scores. Effect size was measured using the Cramer's V test, the results of which were interpreted using the method put forward by Cohen.[98] Reliability analysis using Cronbach's alpha was carried out on 31 statements across 6 domains. An alpha coefficient of ≥ 0.7 was considered to indicate acceptable internal consistency, while an alpha coefficient of ≥ 0.8 was considered to indicate very good internal consistency.

2.4 Results

2.4.1 Respondent Demographics

A total of 1,749 surveys were completed by healthcare staff. Due to the data collection methods used, a response rate could not be calculated. The respondent demographics are displayed in **Table 2.1**. The site with the most respondents was site F, the large university teaching hospital (n=768, 43.9%). Most survey respondents were nurses (n=688, 39.3 %), who had spent more than 10 years working in their current healthcare organisation (n=760, 43.9%) and more than 5 years in their current clinical area (n=753, 43.0%). When the respondents who did not specify their clinical area were excluded (grouped as '*Other*' (239, 13.7%)), the most common clinical area was '*Medical*' (n=226, 12.9%), followed by '*Social Care (Older People)*' (n=189, 10.9%).

Table 2.1: Demographics

Demographic Characteristics	**Frequency (n=1749)**	**Percent (%)**
Setting		
Site A	460	26.3
Site B	92	5.3
Site C	131	7.5
Site D	85	4.9
Site E	213	12.2
Site F	768	43.9
Job Category		
Physician	330	18.9
Nurse	688	39.3
Health and Social Care Professional (HSCP)	191	10.9
Pharmacist	11	0.6
Clerical/Admin	45	2.6
Other	181	10.3
HCA	125	7.1
Home Help	42	2.4
Midwife	74	4.2
Clinical Area		
Mixed medical/surgical	150	8.6
Medical	226	12.9
Surgical	129	7.4
ICU	28	1.6
Paediatric	92	5.3
Neurological	27	1.5
Cardiac Surgical	12	0.7
Other	239	13.7
Non-clinical	7	0.4
Women & Infant's Services	213	12.2
Social Care (Disability)	10	0.6
Social Care (Older People)	189	10.8
Primary Care	118	6.7
Health & Wellbeing	19	1.1
Mental Health	175	10.0
Time Spent Working in Healthcare Organisation		
<1 Year	317	18.1
1-5 Years	407	23.3

Demographic Characteristics	Frequency (n=1749)	Percent (%)
5-10 Years	189	10.8
>10 Years	760	43.5
Time Spent Working in Clinical Area		
<1 Year	371	21.2
1-5 Years	499	28.5
>5 Years	752	43.0

2.4.2 Safety Culture Domain Scores

The mean, median, interquartile range and standard deviation for the study population in each of the six safety culture domains are displayed in **Table 2.2**, along with the international benchmark mean score for each domain. The study population scored above the international benchmark in five domains, *Teamwork Climate, Safety Climate, Job Satisfaction, Stress Recognition* and *Perceptions of Management,* and slightly below the international benchmark for the domain *Working Conditions*.

Table 2.2: Safety Culture Domain Score Descriptive Statistics

Statistic	Teamwork Climate	Safety Climate	Job Satisfaction	Stress Recognition	Perceptions of Management	Working Conditions
Mean	78.11	74.91	74.81	77.83	54.29	54.87
Median	83.33	78.57	80	81.25	55	56.25
Interquartile Range	29	26	33	33	40	38
Standard Deviation	19.63	19.33	22.7	21.61	26.38	24.85
International Benchmark (Mean)	68.5	65.9	63.6	67.8	46.4	55.9

The mean, median, interquartile range, standard deviation and percent positive score for each study site in the six safety culture domains are displayed in an extended results table in **Table 2.3**: Safety Culture Domain Scores by Study Site. Site D had the highest median score for the domains *Teamwork Climate* (87.50) and *Perceptions of Management* (75.00), sites B and D had the same median score for the domains *Job Satisfaction* (90.00), *Safety Climate* (85.71) and *Working Conditions* (75.00), and site F had the highest median score for the domain *Stress Recognition* (87.50). Site E had the lowest median score in the domains *Teamwork Climate* (70.83), *Safety Climate* (67.86), and *Stress Recognition* (68.75), site F had the lowest median score for the domain *Perceptions of Management* (45.00), and sites E and F both had the lowest median scores for the domains *Job Satisfaction* (75.00) and *Working Conditions* (50.00).

Table 2.3: Safety Culture Domain Scores by Study Site

Statistic	**Teamwork Climate**	**Safety Climate**	**Job Satisfaction**	**Stress Recognition**	**Perceptions of Management**	**Working Conditions**
Site A						
Mean	78.58	77.73	76.90	79.51	64.57	58.24
Median	83.33	82.14	81.25	83.33	65.83	58.33

Statistic	Teamwork Climate	Safety Climate	Job Satisfaction	Stress Recognition	Perceptions of Management	Working Conditions
Interquartile Range	29.17	28.57	30.00	33.33	43.75	32.81
Standard Deviation	22.12	20.12	22.74	22.27	27.45	26.03
Percent Positive (%)	69.90	66.30	67.80	72.20	41.10	31.50
Site B						
Mean		81.46	88.21	70.54	70.71	68.15
Median		85.71	90.00	75.00	72.50	75.00
Interquartile Range		36.61	16.25	38.54	21.25	12.50
Standard Deviation		16.45	13.39	21.66	15.67	15.47
Percent Positive (%)		75.00	79.30	66.30	42.40	42.40
Site C						
Mean	79.94	75.14	78.38	78.92	58.87	59.44
Median	83.33	75.00	80.63	81.25	60.00	62.50
Interquartile Range	20.83	21.43	30.00	31.25	30.00	37.50
Standard Deviation	16.22	15.99	19.58	20.99	23.56	24.10
Percent Positive (%)	71.00	55.70	64.10	68.70	29.80	29.80
Site D						
Mean	84.49	83.89	84.26	77.08	71.44	71.99
Median	87.50	85.71	90.00	83.33	75.00	75.00

Statistic	Teamwork Climate	Safety Climate	Job Satisfaction	Stress Recognition	Perceptions of Management	Working Conditions
Interquartile Range	18.75	21.43	25.00	37.50	32.50	25.00
Standard Deviation	17.35	15.00	18.06	23.71	21.65	21.79
Percent Positive (%)	80.00	77.60	77.60	65.90	50.60	58.80
Site E						
Mean	69.17	69.49	73.32	66.56	51.38	48.87
Median	70.83	67.86	75.00	68.75	50.00	50.00
Interquartile Range	20.83	17.86	20.00	18.75	25.00	31.25
Standard Deviation	18.34	14.83	17.54	16.63	18.54	19.92
Percent Positive (%)	42.30	39.00	60.60	38.50	13.60	12.70
Site F						
Mean	79.19	73.71	72.17	80.13	46.49	51.78
Median	83.33	78.57	75.00	87.50	45.00	50.00
Interquartile Range	26.15	28.57	40.00	31.25	40.00	35.42
Standard Deviation	18.53	20.38	24.48	21.38	25.71	24.76
Percent Positive (%)	67.20	56.30	55.10	71.20	17.40	24.00

As displayed in **Figure 2.1**, four study sites had mean scores equal to or above the international benchmark in every domain. Sites E and F scored below the international benchmark in the domain *Working Conditions*.

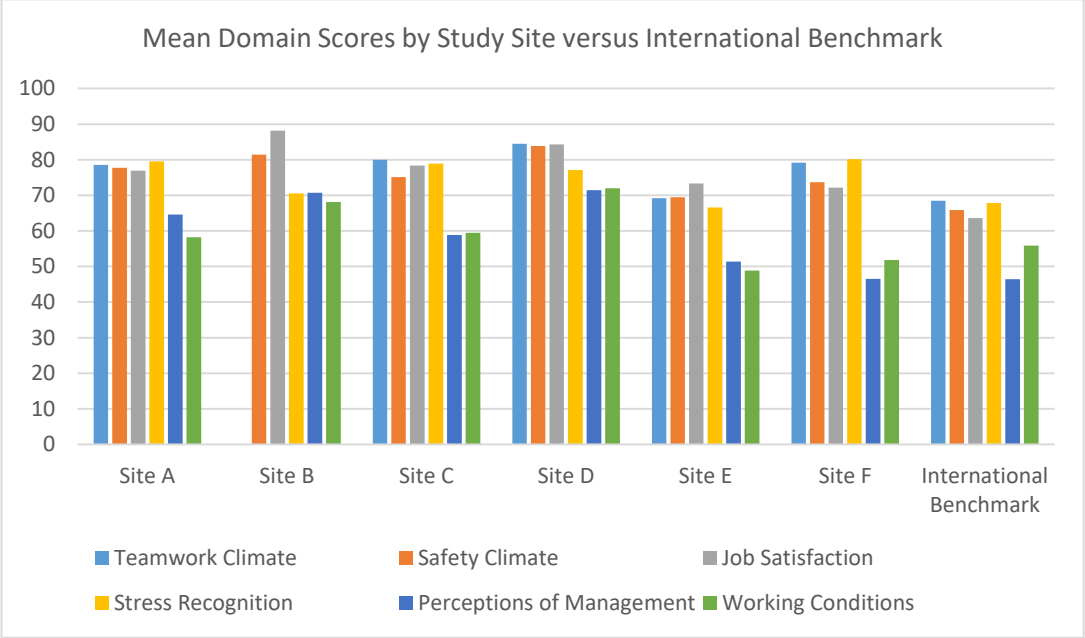

Figure 2.1: Mean Domain Scores by Study Site versus International Benchmark

Subgroup analysis revealed a statistically significant relationship between percent positive domain scores and study site. A strong relationship was found between study site and percent positive domain scores for *Stress Recognition* ($\chi^2(5, n=1720) = 96.5$, $p \leq 0.001$, Cramer's $V=0.237$), *Perceptions of Management* ($\chi^2(5, n=1692) = 154.9$, $p \leq 0.001$, Cramer's $V=0.303$), and *Working Conditions* ($\chi^2(5, n=1734) = 83.9$, $p \leq 0.001$, Cramer's $V=0.220$).

The mean, median interquartile range, standard deviation and percent positive score for each profession in the six safety culture domains are displayed in **Table 2.4**: Safety Culture Domain Scores by Profession. Nurses had the highest median score for the domain *Teamwork Climate* (87.50), HCAs had the highest median score for the domains *Perceptions of Management* (77.50) and *Working Conditions* (62.50), nurses and HCAs had the same median score for the domain *Safety Climate* (82.14), home helps had the highest median score for the domain *Job Satisfaction* (94.38), and physicians had the highest median score for the domain *Stress Recognition* (87.50). Midwives had the lowest median score in the domains *Teamwork Climate* (70.83), *Safety Climate* (71.13), *Perceptions of Management* (45.00) and *Working Conditions* (43.75), home helps had the lowest median score for the domain *Stress Recognition* (66.67), and midwives, HSCPs and physicians had the lowest median scores for the domains *Job Satisfaction* (75.00).

Table 2.4: Safety Culture Domain Scores by Profession

Statistic	**Teamwork Climate**	**Safety Climate**	**Job Satisfaction**	**Stress Recognition**	**Perceptions of Management**	**Working Conditions**
Physician						
Mean	76.12	70.03	71.72	81.04	48.23	52.78
Median	79.17	71.43	75.00	87.50	50.00	56.25
Interquartile Range	20.83	28.57	30.00	31.25	35.00	31.25
Standard Deviation	17.61	19.81	22.96	19.61	23.82	22.43

Statistic	Teamwork Climate	Safety Climate	Job Satisfaction	Stress Recognition	Perceptions of Management	Working Conditions
Percent Positive (%)	61.20	47.60	57.10	71.90	18.00	22.00
Nurse						
Mean	82.01	77.92	75.70	78.62	53.64	56.83
Median	87.50	82.14	80.00	83.33	55.00	58.33
Interquartile Range	25.00	28.57	32.50	33.33	40.00	37.50
Standard Deviation	18.15	18.84	22.61	21.82	27.38	25.81
Percent Positive (%)	74.80	66.60	63.10	68.90	29.10	31.60
HSCP						
Mean	74.12	69.99	71.32	78.88	53.42	49.87
Median	79.17	71.43	75.00	83.33	55.00	50.00
Interquartile Range	29.17	25.00	28.75	33.33	32.50	31.25
Standard Deviation	21.13	20.14	23.41	21.11	21.14	23.45
Percent Positive (%)	58.40	45.50	59.90	69.80	22.20	18.30
HCA						
Mean	78.75	79.89	81.76	74.21	71.89	62.05
Median	83.33	82.14	90.00	75.00	77.50	62.50
Interquartile Range	29.17	21.43	35.00	37.50	41.25	40.10
Standard Deviation	18.68	16.49	19.86	24.56	24.42	26.17

Statistic	Teamwork Climate	Safety Climate	Job Satisfaction	Stress Recognition	Perceptions of Management	Working Conditions
Percent Positive (%)	65.50	72.80	71.20	66.10	56.60	39.50
Home Help						
Mean	73.51	72.51	87.53	60.76	62.55	51.39
Median	75.00	76.79	94.38	66.67	72.50	50.00
Interquartile Range	42.08	42.71	17.81	51.04	70.94	26.56
Standard Deviation	29.67	24.74	15.93	33.58	32.58	24.49
Percent Positive (%)	73.80	64.30	85.70	60.00	53.80	41.50
Midwife						
Mean	68.16	69.25	72.64	66.29	45.97	43.00
Median	70.83	71.13	75.00	67.71	45.00	43.75
Interquartile Range	12.50	14.29	21.88	18.75	20.00	25.00
Standard Deviation	17.51	13.37	17.46	15.59	18.78	18.18
Percent Positive (%)	41.70	35.60	58.90	39.70	11.00	6.80

As displayed in **Figure 2.2**, all professions had mean scores above the international benchmark for the domains *Safety Climate* and *Job Satisfaction*. Midwives had mean scores slightly below the international benchmark for the domains *Teamwork Climate* and *Perceptions of Management*. Midwives and home helps had mean scores

below the international benchmark for the domain *Stress Recognition*, and midwives, home helps and physicians had mean scores below the international benchmark for the domain *Working Conditions*.

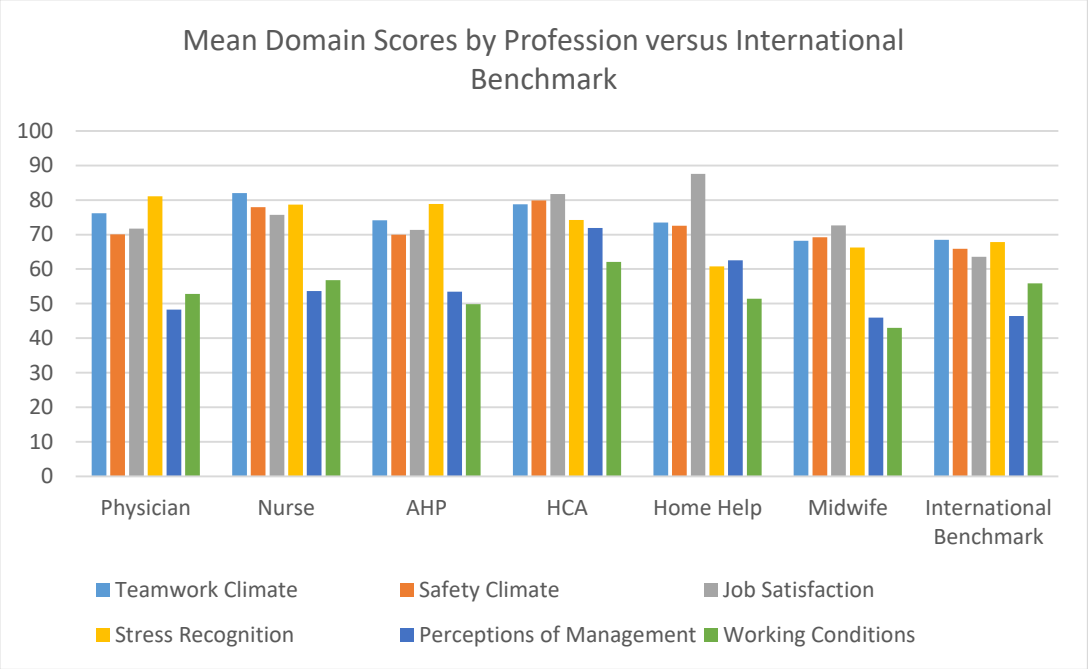

Figure 2.2: Mean Domain Scores by Profession versus International Benchmark

A strong relationship was found between profession and percent positive domain scores for *Safety Climate* ($\chi^2(7, n=1677) = 81.6, p \leq 0.001$, Cramer's V=0.221), and *Perceptions of Management* ($\chi^2(7, n=1636) = 88.8, p \leq 0.001$, Cramer's V=0.233).

2.4.3 Individual Statement Responses

The responses to each of the individual statements are displayed in **Table 2.5**: Individual Statement Responses.

Table 2.5: Individual Statement Responses

Domain	Statement	Strongly Disagree (%)	Slightly Disagree (%)	Neutral (%)	Slightly Agree (%)	Strongly Agree (%)	Missing (%)
Teamwork Climate	Input from my discipline is well received in this clinical area.	2.1	4.6	11.5	23.3	48.5	10.0
	In this clinical area, it is not difficult to speak up if I perceive a problem with patient care.	7.3	11.8	8.3	26.7	36.1	9.8
	Disagreements in this clinical area are resolved appropriately (i.e., not who is right, but what is best for the patient).	3.9	8.7	13.6	25.6	39.5	8.7
	I have the support I need from other personnel to care for patients.	2.6	6.0	7.7	24.0	49.5	10.2
	It is easy for personnel here to ask questions when there is something that they do not understand.	1.7	4.1	3.9	23.4	59.9	7.0
	All disciplines in this clinical area work together as a well-coordinated team.	4.1	8.9	7.8	28.1	42.3	8.9
Safety Climate	I would feel safe being treated here as a patient.	2.3	5.8	8.0	24.1	56.5	3.3

Domain	Statement	Strongly Disagree (%)	Slightly Disagree (%)	Neutral (%)	Slightly Agree (%)	Strongly Agree (%)	Missing (%)
	Medical errors are handled appropriately in this clinical area.	1.9	5.9	11.4	24.6	47.5	8.7
	I know the proper channels to direct questions regarding patient safety in this clinical area.	1.9	5.4	7.7	25.6	55.6	3.8
	I receive appropriate feedback about my performance.	10.6	13.2	19.2	23.6	28.5	4.8
	In this clinical area, it is not difficult to discuss errors.	7.4	15.3	13.4	27.5	31.1	5.2
	I am encouraged by my colleagues to report any patient safety concerns I may have.	2.4	5.3	10.6	24.8	53.3	3.5
	The culture in this clinical area makes it easy to learn from the errors of others.	3.9	11.1	13.2	31.3	35.6	4.9
(no domain)	My suggestions about safety would be acted upon if I expressed them to management.	7.3	10.6	15.7	29.0	34.2	3.2
Job Satisfaction	I like my job.	1.9	3.5	10.0	24.8	57.8	1.9
	Working here is like being part of a large family.	7.9	10.5	17.1	28.3	33.7	2.6
	This is a good place to work.	4.2	7.3	11.7	30.8	44.1	1.9

Domain	Statement	Strongly Disagree (%)	Slightly Disagree (%)	Neutral (%)	Slightly Agree (%)	Strongly Agree (%)	Missing (%)
	I am proud to work in this clinical area.	1.4	3.1	9.1	26.5	56.1	3.6
	Morale in this clinical area is high.	10.2	14.0	13.7	28.8	29.7	3.6
Stress Recognition	When my workload becomes excessive, my performance is impaired.						
	I am less effective at work when fatigued.	2.4	3.4	5.2	31.4	54.3	3.3
	I am more likely to make errors in tense or hostile situations.	4.0	6.1	8.7	30.6	47.1	3.4
	Fatigue impairs my performance during emergency situations (e.g. emergency resuscitation, seizure).	5.1	8.4	8.9	18.2	23.5	35.9
Perceptions of Management	Hospital management supports my daily efforts.	16.9	16.4	23.5	20.9	15.6	6.7
	Hospital Management doesn't knowingly compromise patient safety.	9.1	12.3	20.8	22.6	26.8	8.3
	Hospital management is doing a good job.	11.7	15.3	26.1	24.1	16.3	6.6
	The hospital constructively deals with problem employees.	16.6	18.8	28.3	14.5	12.1	9.6

Domain	Statement	Strongly Disagree (%)	Slightly Disagree (%)	Neutral (%)	Slightly Agree (%)	Strongly Agree (%)	Missing (%)
	I am provided with adequate timely information about events in the hospital that might affect my work.	10.3	18.0	18.9	27.0	19.6	6.1
Working Conditions	The levels of staffing in this clinical area are sufficient to handle the number of patients.	36.6	24.1	9.4	14.9	10.1	4.9
	This hospital does a good job of training new personnel.	11.4	18.4	16.0	28.7	22.3	3.3
	All the necessary information for diagnostic and therapeutic decisions is routinely available to me.	6.7	15.0	18.1	27.9	20.4	11.9
	Trainees in my discipline are adequately supervised.	7.7	12.6	11.3	25.6	34.8	7.9

The statements with the highest percentage of '*Strongly Agree'* responses were:

- *It is easy for personnel here to ask questions when there is something that they do not understand* (Teamwork Climate, 59.9% strongly agreed)
- *I like my job* (Job Satisfaction, 57.8% strongly agreed)
- *I would feel safe being treated here as a patient* (Safety Climate, 56.5% strongly agreed).

The statements with the lowest percentage of '*Strongly Agree'* were:

- *The levels of staffing in this clinical area are sufficient to handle the number of patients* (Working Conditions, 10.1% strongly agreed)
- *The hospital constructively deals with problem employees* (Working Conditions, 12.1% strongly agreed)
- *Hospital management supports my daily efforts* (Perceptions of Management, 15.6% strongly agreed).

2.4.4 Internal Consistency

The Cronbach's α values for the six domains are displayed in **Table 2.6**. The six domains had Cronbach's α values ranging from 0.74 (*Working Conditions*) to 0.87 (*Job Satisfaction*), indicating that all six domains had acceptable internal consistency, and four domains (*Teamwork Climate*, *Safety Climate*, *Perceptions of Management*, and *Job Satisfaction*) had very good internal consistency.

Table 2.6: Internal Consistency

Domain	**No. of Items**	**Cronbach's α**
Teamwork Climate	6	0.80
Safety Climate	7	0.81
Job Satisfaction	5	0.87
Stress Recognition	4	0.77
Perceptions of Management	5	0.86
Working Conditions	4	0.74

2.5 Discussion

The aim of this study was to use the SAQ to investigate the perceptions of Irish healthcare staff towards patient safety culture in their clinical area. The study was carried out in a selection of diverse healthcare settings in order to give an indication of patient safety culture across the Irish healthcare system, from community healthcare to tertiary hospital care. In general, study participants were found to have positive attitudes towards patient safety culture, but scored negatively in the domains *Working Conditions* and *Perceptions of Management*. Safety culture domain scores were found to be dependent on both healthcare setting and profession, and some interesting differences were identified between subgroups.

Healthcare workers in the south-west of Ireland were found to have positive attitudes towards teamwork, patient safety, job satisfaction and stress recognition, but had considerably more negative views towards management and working conditions. Growing levels of dissatisfaction with hospital working conditions in Ireland have been evident in recent publications in both the scientific literature and in the Irish media.[99–101] Ireland has seen large-scale outward migration of medical professionals since the 2008 global financial crisis, which has been partly attributed to the comparatively poor working conditions in Irish hospitals.[102] The Irish healthcare system has had a relative shortage of doctors and nurses over the last 10 years compared to other countries in the Organisation for Economic Co-operation and Development (OECD), and is under-resourced in terms of staffing, medical equipment, and hospital beds.[80,100,101,103] More than 50% of survey respondents

disagreed with the statement "*The levels of staffing in this clinical area are sufficient to handle the number of patients*". Inadequate working conditions, and overwhelming workloads, can cause staff to feel unsupported by management, leading to poor working relationships between management and frontline staff.[94] Less than half of survey respondents agreed with the statement "*Hospital management supports my daily efforts"*, indicating that the perceptions of frontline staff towards management is an area that may warrant further investigation. Boussat *et al.* used the HSOPSC to investigate the safety culture in a French hospital, and also found that respondents felt that hospital management were disconnected form frontline staff.[41]

Subgroup analysis revealed note-worthy differences between the study sites. Sites B and D, a small psychiatric hospital and small public hospital, had the highest median scores for five of the six safety culture domains. In contrast, sites E and F, a large maternity hospital and a major university teaching hospital, had the lowest median scores between them for each of the safety culture domains. It is possible that staff in smaller hospitals have more positive perceptions of safety culture, perhaps because interpersonal communication, which is considered a key aspect of patient safety, is easier in a smaller workplace.[41]

Subgroup analysis of professions also produced some interesting results. Midwives had the lowest median score in four domains, although this may be because they were the largest group of respondents in Site E, which scored poorly overall. Nurses

and HCAs scored well in the domains *Teamwork Climate* and *Safety Climate*, which could be attributed to the fact that they work on the front line and tend to work in teams. As might be expected, physicians scored highly in the domain *Stress Recognition*. This is in keeping with the findings of Sexton *et al.* in 2000, that staff who encounter more emergency situations, such as surgeons and ICU staff, tend to have more positive attitudes towards this domain.[46] In contrast, home helps had the lowest median score for *Stress Recognition,* possibly because they work outside of the hospital setting. Physicians, midwives and HSCPs had low scores in the domain *Working Conditions*, which could be due to low staffing levels or a feeling of not being supported by management.[41,94]

The quantitative results of the SAQ were similar to those of other studies. As indicated by the international benchmark, hospitals tend to score well on the domains *Teamwork Climate*, *Safety Climate*, *Job Satisfaction* and *Stress Recognition*, and usually receive lower scores in the domains *Perceptions of Management* and *Working Conditions*.[45] This was the case in studies carried out by Nguyen *et al.* in hospitals in northeast Italy,[29] Kaya *et al.* in Turkish hospitals,[92] and Relihan *et al.* in the AMAU of another Irish hospital.[30] In contrast, Kristensen *et al.* used the SAQ in Danish hospital units and found that *Stress Recognition*, *Perceptions of Management*, and *Safety Climate* received the lowest mean scores.[104]

We recognise a number of limitations to this study. Staff perceptions of safety culture are a subjective measure of patient safety and are likely to change with time. This

study was carried out in a number of healthcare settings, over the course of nearly two years. Survey distribution was carried out during the winter months in some settings, and during the summer months in others. The settings in which the survey was carried out during the winter may have had more negative perceptions of safety culture, as winter is the busiest time of year for most hospitals. Every effort was made to maximise survey distribution and staff participation, however due to short time periods for survey distribution and the distribution methods used, it is likely that not all staff in each setting had the opportunity to carry out the survey.

We believe that the strength of this study lies in the diverse range of healthcare settings in which the study was carried out, and the large number of HCPs who took part in the study, which has produced an accurate depiction of the safety culture in Irish healthcare. However, while surveys such as the SAQ are useful in providing baseline information on the safety culture in a population, and in comparing safety culture between settings and subgroups, they do not provide much nuanced information as to why HCPs hold certain perceptions about the safety culture in their clinical area. Future research will involve the use of qualitative research methods to gain more insight into the safety culture, and barriers and facilitators to safe patient care, in Irish healthcare.

2.6 Conclusion

The aim of this study was to investigate the safety culture amongst HCPs in the south-west of Ireland. In general, the study population had positive attitudes regarding patient safety culture, however attitudes towards the domains '*Working Conditions*' and '*Perceptions of Management*' were more negative. This study has provided a baseline assessment of the safety culture in Irish healthcare, which forms the basis for the qualitative investigations that are described in the next two chapters.

Chapter 3 : Healthcare Provider's Perceptions of Patient Safety Culture in the South-West of Ireland: Qualitative Results of a Mixed-Methods Study

Publication:

The work presented in this chapter and the previous chapter has been published in the following peer reviewed paper:

Gleeson LL, Tobin L, O'Brien GL, Crowley EK, Delaney A, O'Mahony D, Byrne S., Safety culture in a major accredited Irish university teaching hospital: a mixed methods study using the safety attitudes questionnaire. Ir J Med Sci. 2020 Apr 10. doi: 10.1007/s11845-020-02228-0.

3.1 Abstract

3.1.1 Aim

Qualitative analysis can provide valuable insight into the safety culture of healthcare organisations. The aim of this study was to carry out a qualitative analysis of HCPs' responses to the question: '*What are your top 3 recommendations to improve patient safety in your clinical area?*'.

3.1.2 Methods

The SAQ was carried out in six healthcare settings, ranging from a community healthcare organisation to a large university teaching hospital, in the south-west of Ireland between December 2017 and November 2019 (**Chapter 2**). At the end of the survey, participants were asked '*What are your top three recommendations to improve patient safety in your clinical area?*'. The responses to this question in each setting were subjected to a thematic analysis and the identified themes were compared and contrasted in order to develop overall themes for the region.

3.1.3 Results

TA revealed six themes: '*Staffing*', '*Patient Care*', '*Working Conditions*', '*Communication*', '*Incident Reporting*' and '*Training & Education*'. These themes reflect what Irish healthcare workers perceive to be the barriers towards providing safe patient care in their clinical area.

3.1.4 Conclusion

This study has identified the issues that Irish healthcare providers feel need to be addressed to improve patient safety in their places of work. The results of this study can inform future research and policy decisions regarding patient safety in Irish healthcare.

3.2 Introduction

In 2017, the WHO announced that its third Global Patient Safety Challenge, '*Medication Without Harm'*, would focus on medication safety, aiming to reduce the global rate of MEs by 50% within five years.[72] MEs, defined as '*any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the HCP, patient, or consumer*', are a leading cause of preventable harm worldwide, estimated to incur an annual global cost of US$42 billion.[72,105]

Despite the level of harm with which they are associated, few studies have investigated the perceived causes of MEs amongst HCPs. A literature review carried out by O'Shea in 1999 identified a number of factors that contribute to MEs, including nurses' knowledge of medications, staffing levels, work environment, and the quality of written prescriptions.[106] Ryan *et al.* found that aspects of the work environment, such as workload and time pressure, as well as poor availability and quality of information on patient's medication at admission, were perceived causes of MEs amongst Scottish trainee doctors.[107] In a study of Serbian nurses, Svitlica *et al.* found that inadequate staffing levels, communication, and drug packaging were potential causes of MEs.[108] It is clear that MEs are a multidisciplinary issue caused by a diverse range of contributing factors.

Since the publication of the report *To Err is Human* by the US IOM in 1999, there has been increasing international interest in how to improve patient safety and prevent

MEs.[3] A key theme in that report is that in order to work towards the reduction of MEs, it is first necessary to fully comprehend the systems and contextual factors in which these errors take place.[3]

Patient safety culture has become an increasingly popular metric for the measurement of patient safety in recent years.[32] Safety culture is generally measured using surveys such as the HSOPSC or the SAQ[36,45] To date, few qualitative studies have been carried out on patient safety culture. Qualitative research methods can provide valuable insight into the views and experiences of healthcare workers, and have been used in the patient safety research for many years.[109–111]

The primary aim of this study was to investigate the perceptions of HCPs of the safety culture in Irish healthcare organisations. A secondary aim of this study was to identify what HCPs perceived to be the barriers to safe patient care in their clinical areas. This was a mixed-methods study, the qualitative results of which are presented in this chapter.

3.3 Methods

3.3.1 Study Design and Setting

This research was carried out as part of a survey study to determine the safety culture in healthcare organisations in the south-west of Ireland. As described in **Chapter 2**, the SAQ was distributed to all staff in six study sites between December 2017 and November 2019. Ethical approval was obtained from the local research ethics committee prior to study commencement (**Appendix 2**). The SAQ is a widely used and validated survey for the measurement of safety culture which, among other closed-ended questions, contains an open-ended comments section in which respondents are asked the question: '*What are your top 3 recommendations for improving patient safety in your clinical area?*'.[30,45]

The study was carried out in the following six settings, which capture the range of healthcare provision sites in the Republic of Ireland:

- one community healthcare organisation (site A)
- one psychiatric hospital (site B)
- one large public voluntary hospital (site C)
- one small public voluntary hospital (site D)
- one maternity hospital (site E)
- one large university teaching hospital (site F).[112]

3.3.2 Qualitative Data Analysis

The qualitative data from the open comments section of the questionnaire were subjected to a thematic analysis according to the method described by Braun and Clarke.[113] Thematic analysis involves six phases, described in **Table 3.1**.

Table 3.1: Thematic Analysis Steps [113]

Thematic Analysis Step No.	**Description**
1	Familiarisation with the data
2	Generation of initial codes
3	Searching for themes
4	Reviewing themes
5	Defining and naming themes
6	Producing the report.

Data familiarisation began during transcription and reading of the comments from each study site. The comments were coded by the primary author and a sample of comments from each setting was coded by a co-investigator (GLO'B). Relationships between the codes were explored and developed into themes by both researchers. The themes in each setting were named and defined, and disparities were identified and resolved, through discussion. The major themes from each of the six settings were then reconciled to produce a group of themes applicable to the entire study population. To facilitate analysis, data were entered into QSR International's NVivo 11 Qualitative Data Analysis Software.[114] Each study participant was given a unique code reflecting their profession and site. Study participants who did not specify their profession were included in a subcategory labelled 'Other'.

3.4 Results

A total of 1,749 surveys were completed, as detailed and discussed in **Chapter 2**. As seen in **Table 2.1**, most survey respondents were nurses (n=688, 39.3 %), who had spent greater than 10 years working in their current healthcare organisation (n=760, 43.9%) and greater than 5 years in their current clinical area (n=753, 43.0%). Not all respondents submitted comments, and the number of comments submitted by each respondent varied. The following six themes emerged from the comments:

1) *'Staffing Issues'*
2) *'Patient Care'*
3) *'Working Conditions'*
4) *'Communication'*
5) *'Incident Reporting'*
6) *'Training & Education'*

3.4.1 *'Staffing Issues'*

The most frequently mentioned topic across all five settings was the need for better staffing. A large proportion of the comments called for *"more staff"*, *"more nurses"* or *"more doctors"*. Respondents felt that the ratio of staff members to the number of patients requiring treatment was too low, resulting in unmanageable workloads which caused high levels of stress among healthcare workers.

"*Staffing levels are inadequate to safely treat patients. Current staff are overworked and fatigued"* (Staff Nurse F60)

Another common recommendation across the study population was the need for a better skill mix amongst staff. Particularly in the inpatient setting, it was often felt that there was a lack of senior staff, notably senior nurses, and a high proportion of newly qualified staff, which resulted in staff balancing supervision of less experienced staff with caring for patients, or junior staff not feeling adequately supported. Poor skill mix was sometimes attributed to high staff turnover.

"Improve the skills mix among staff" (Clinical Nurse Manager (CNM) B11)

"Reduce staff turnover especially nurses and doctors. Need good mix of experience and younger and older staff" (HSCP C1)

Staffing levels at night time and weekends were thought to be particularly poor, and respondents felt that there were not enough staff to cover holidays, sick leave, or maternity leave. One respondent highlighted the need to have a full complement of staff even when staff are out on leave.

"Staff complements when people out sick and on holidays - staff constantly asked to work overtime to cover these" (Staff Nurse A1)

3.4.2 *'Patient Care'*

Respondents often felt that there was a need for more patient-centred care in their clinical setting. This could involve having more time to care for individual patients or providing better education to patients and their families.

"Ensure patient-centred care at all times" (Other D17)

"Give more time to our clients" (Home Help A2)

"Better patient education" (Staff Nurse F194)

Continuity of care was considered important in providing safe patient care, while respondents also commented that there should be more evidence-based protocols in place for specific clinical situations.

"Continuity of care of a patient on a daily basis" (Home Help A29)

"Appropriate pathways in place on site for escalation of care" (Other D16)

Patient notes were frequently commented on, from handwriting and good history-taking, to the need for electronic notes and access to patient notes for all HCPs.

"Proper documentation of patient information" (Senior House Officer (SHO) D7)

"Handwriting obliged to be legible/understandable or in capital letters from all the staff" (CNM F25)

"Electronic health records" (Pharmacy Technician D2)

Specific patient care issues varied across healthcare settings. For example, comments about induction of labour were commonly submitted by staff working in the maternity hospital, and comments about needing extra support to care for patients with dementia or mental health issues were more frequently submitted by staff working in community healthcare.

"Less induction of labour" (Midwife E13)

"Two people needed for some house calls for difficult situations, i.e. bedbound, dementia, etc." (Home Help A32)

3.4.3 *'Working Conditions'*

Issues with management and working conditions were some of the most common topics brought up by survey respondents. In all study sites, respondents felt that they would benefit from more supportive, approachable management.

"[Management] need to be more approachable so that staff can speak with them if they have any problem" (Staff Nurse A12)

There was a perceived disconnection between management and frontline staff; frontline healthcare workers often felt that management did not fully understand or appreciate the work they did, or did not listen to their concerns.

"Hospital management has to appreciate nurses for their efforts, which is not happening." (Staff Nurse F41)

"Speak with the frontline staff about things that affect the frontline staff" (CNM E13)

The need for new equipment, or for broken or outdated equipment to be repaired or replaced, was frequently commented upon. Respondents from all healthcare settings recommended that facilities needed to be updated or improved. Survey respondents mentioned clinical areas that were too small or not fit for purpose, or that did not meet modern standards.

"Ward needs refurbishment, not fit for purpose" (Staff Nurse F145)

"Building and equipment need upgrade." (HSCP A19)

Respondents also mentioned the need for better resources, such as better Information Technology (IT) systems or access to more clinical resources.

"Provide the IT department with adequate resources to implement and oversee a complete IT support service" (Other F86)

"Easy access to children's [British National Formulary] & guidelines on wards" (SHO F26).

Psychological wellbeing was an important topic amongst survey respondents. As mentioned previously, increasing workloads were putting strain and pressure on healthcare staff, leading to problems with stress and burnout. Staff often mentioned feeling overworked and under-appreciated, which impacted negatively on morale. Some respondents also mentioned not feeling respected by management, or a lack of respect from certain professions for other staff members.

"Good staff morale" (Assistant Director of Nursing (ADON) C2)

"Respect the staff [we] have, if treated better would not be leaving" (Staff Nurse D10)

3.4.4 *'Communication'*

Communication was considered to be a key component of patient safety.

"Communication between nursing staff and medical staff, need more effort to ensure patient safety" (CNM F33)

Survey respondents mentioned a number of different types of communication that needed improvement. Communication with management, both maintaining open channels of communication to management and ensuring good communication from upper management to staff on the ground, were considered very important.

> *"Improve communication channels across clinical areas and from/to management"* (Physiotherapist C3)

Respondents also felt that communication between disciplines and between medical teams needed to be improved, as well as communication with healthcare workers in the community.

> *"More/better communication between different disciplines"* (Midwife E21)

> *"Ensure good communication links between acute and primary care services"* (HSCP A12)

Effective communication with patients and their families was also considered to be vital to patient safety.

> *"Effective communication between all disciplines, patients and families"* (Other F89)

3.4.5 *'Incident Reporting'*

In all healthcare settings, survey respondents felt that instilling a non-punitive incident reporting culture would improve patient safety in their clinical area.

"Non-blame-laying systems of reporting errors" (SHO F9)

"[Recognise] human error is possible; no one is perfect. Use errors as a way of reflecting and finding solutions together as a team to help repeat errors." (Clinical Nurse Supervisor (CNS) B3)

In some clinical areas, staff were reluctant to report incidents or near-misses for fear of being criticized or punished.

"Having open disclosure and not being reprimanded or punished for mistakes" (Staff Nurse E21)

Even in clinical areas where a no-blame reporting culture was encouraged, the incident reporting system was often impractical or time-consuming, and feedback on incident reports was rarely provided.

"Clearer guidelines and improved process for reporting concerns, plus feedback when concerns are reported" (Home Help A42)

A frequent recommendation was the need for a regular meeting or forum where staff could discuss incidents and near misses as well as more general patient safety concerns.

"[Share] lessons learned from patient safety events with all staff" (ADON B3)

"Forum to admit to errors without being penalised/judged" (Staff Nurse F153)

3.4.6 *'Training & Education'*

Survey respondents stressed the importance of ongoing training and education in the provision of safe patient care.

> *"Ongoing education and upskilling staff on patient safety"* (Staff Nurse A23)

Respondents from every healthcare setting felt that they were not provided with sufficient opportunities for training and upskilling. When such opportunities were provided, staff members were often unable to attend due to large workloads and low staffing levels.

> *"Regular (protected) time allocated for education/training of staff"* (Staff Nurse F86)

Continuing professional development and giving staff the chance to study more in areas that interest them were considered to be good for staff wellbeing, and in turn have positive effects on patient safety.

> *"Some staff have expressed interest in studying other areas and they should be encouraged to do so"* (HCA C2)

Training and supervision for new staff was also seen as an important issue. New staff members did not always receive appropriate induction or training on certain IT systems or equipment.

> *"Proper training for junior staff"* (Staff Nurse F42)

3.5 Discussion

This study involved the application of qualitative data analysis methods to survey data, in orderto investigate the attitudes of healthcare providers towards patient safety in the south-west of Ireland, and to identify what those healthcare providers consider to be the barriers towards patient safety.

The most prominent theme that emerged from the comments was the need for better staffing levels across all six study sites. According to study participants, inadequate staffing levels were causing healthcare workers to feel overworked and fatigued, which in turn could compromise their ability to provide safe care to their patients. Poor staffing levels have been an ongoing problem across the country in recent years.[99] Ireland has a relative shortage of doctors per 1,000 population compared to other OECD countries (3.0 vs 3.5 in 2017), and is one of only four countries in the OECD that has seen the nursing numbers decrease in recent years, from 13.6 per 1,000 population in 2008 to 12.2 per 1,000 population in 2017.[79,80]

A number of study participants suggested that improving working conditions would have a positive impact on both job satisfaction and patient safety; a large number of recommendations requested new equipment and refurbished work environments. A 2007 study by Stone *et al*. found that nurse working conditions were associated with a number of patient safety outcomes including 30-day mortality.[115] Despite spending the fifth highest amount of money per capita on health globally, the number of hospital beds per 1000 population in Ireland is still below the OECD average (3.0 vs

4.7 in 2017).[80] The relationship between frontline staff and management is also a key aspect of working conditions. Recommendations often mentioned that staff felt underappreciated by hospital management or did not feel that they could approach management with their concerns. Job satisfaction in healthcare has been found to be inversely related to adverse events.[116]

Unfortunately, the improvement of staffing levels and resources for Irish healthcare organisations is beyond the scope of this research. Nevertheless, a number of barriers and facilitators for safe patient care were identified in this study which could be targeted by an intervention to improve patient safety.

One potential intervention would be to increase the practice of patient-centred care in Irish healthcare. Patient-centred care has been described as care that focusses on the patient and their individual healthcare needs.[117] Some of the principles of patient-centred care put forward by the Health Service Executive (HSE) include making the patient a partner in their own healthcare, and supporting the patient to make informed decisions about their own healthcare.[118] One way to achieve these goals, as suggested by a number of study participants, would be to provide better education to patients on their medical conditions, current medications and treatment options.[119] Having more time to spend with patients would allow for better patient education and patient centred care, however this is directly affected by poor staff levels as discussed in **Section 3.4.1**.

Many study participants felt that improving communication in their clinical area would help to improve patient safety: *"Effective communication between all disciplines, patients and families"*. Communication failure is a leading cause of preventable adverse events.[9] It is vital to have good communication between all stakeholders in patient care. Tools to improve communication between HCPs include debriefings and the Situation-Background-Assessment-Recommendation (SBAR) tool.[120] The implementation of interventions to improve communication could improve patient safety both directly and indirectly, by demonstrating a hospital's commitment to improving patient safety, and thereby improving patient safety culture.

When a medication incident occurs, it is necessary to identify the systems failures that contributed to the incident, so that measures can be put in place to prevent its recurrence.[3] Two factors that are key to promoting ME reporting are having an effective incident reporting system in place, and encouraging a non-punitive culture throughout the organisation.[121] It is clear from the results presented in this chapter that Irish healthcare workers recognise the importance of these two factors, however it seems that these concepts have not yet been implemented fully across the healthcare service. Any interventions promoting a no-blame culture or trialling a new reporting system would demonstrate the hospital's commitment to safety and improve safety culture. A forum in which to discuss patient safety issues and near misses in a safe, non-punitive environment could also improve incident reporting and

promote positive safety culture. As part of a series of interventions to improve ME reporting in a paediatric critical care centre in the US, Costello *et al.* established a monthly forum to discuss medication incidents and brainstorm methods to prevent future incidents. An increase in the number of incident reports and a decrease in the severity of reported errors were observed.[122]

Finally, providing better opportunities for training and education could help to improve patient safety and patient safety culture in the study sites. Continuing professional education is important to keep healthcare providers up to date with the latest evidence-based practice and to improve their skills.[123] Providing good educational and training opportunities is also necessary for newer staff to learn about the systems and processes in the hospital. Study participants felt that even when training opportunities were provided in their place of employment, they were often too overworked to attend. Delivering short educational sessions on issues such as medication safety, open disclosure or incident reporting would be beneficial to staff and could improve safety culture in the hospital. Simpson *et al.* reported that a year-long patient safety and quality project involving perinatal teams in 15 Michigan hospitals, in which monthly educational webinars were carried out, resulted in significant improvements in safety culture as measured using the SAQ.[65]

The analysis of survey comments has been utilised in other studies to investigate hospital safety culture. For example, the study by Relihan *et al*. also analysed the responses to the question, '*What are your top 3 recommendations for improving*

patient safety in your clinical area?'. Issues highlighted by participants of that study included communication, security, equipment/facilities, medication safety, HCAs, patient issues, and education.[30] The HSOPSC contains an open comments section, which reads '*Please feel free to write any comments about patient safety, error, or event reporting in your hospital*'.[36] When Boussat *et al*. analysed responses to the HSOPSC, they found that staffing and hospital management support were the most commonly reported issues, followed by organisation and cooperation, and adverse event reporting.[41] There is considerable agreement between the results of these studies and those reported here, indicating that the same patient safety issues are faced in many clinical settings, regardless of size or location.

This study has a number of limitations. Data collection took place over a period of two years, which saw growing national dissatisfaction with the health service, record numbers of patient waiting on trolleys for treatment, and prolonged national nursing strikes.[100,124,125] Staff attitudes towards patient safety could have changed in this time. However, a strength of this study is the study population, which includes a wide range of healthcare providers from consultants in one of the country's largest hospitals to public health nurses working in a rural setting. We believe that including such a diverse group of HCPs makes the results of this study more representative of Irish healthcare and provides valuable insights into patient safety culture in this country.

3.6 Conclusion

The aim of this study was to gain insight into the perceptions of patient safety amongst healthcare providers across the south-west of Ireland. The findings presented in this chapter were largely in keeping with the results presented in **Chapter 2**. The six themes, '*Staffing Issues'*, '*Working Conditions'*, '*Patient Care'*, '*Incident Reporting'*, *'Communication'*, and '*Training & Education'* were identified as important issues amongst Irish healthcare providers trying to provide safe patient care. The knowledge gained in this study can inform future research on patient safety in Ireland and research on methods to improve patient safety worldwide.

Chapter 4 : Healthcare Professionals' Perceptions of Safety Culture in an Irish Teaching Hospital: A Qualitative Interview Study

Publication:

The work presented in this chapter has been submitted for publication in *The Irish Journal of Medical Science*.

4.1 Abstract

4.1.1 Aim

It is generally agreed that the Irish healthcare system is understaffed and under-resourced due to historic underfunding and the after-effects of the 2008 financial crisis. The aim of this study was to determine healthcare workers' perceptions of the safety culture in a large Irish teaching hospital in a climate of national under-resourcing of healthcare.

4.1.2 Methods

Seventeen semi-structured interviews were carried out with patient-attending staff between February and June 2019. Interviews were transcribed verbatim and analysed using thematic analysis.

4.1.3 Results

Two major themes emerged from the data: (i) the hospital as a place of work/employment, and (ii) the hospital as a place of care provision. Subthemes that emerged under the theme of the hospital as a place of work/employment were '*Hospital Environment*', '*Staff Wellbeing'* and '*Error Reporting*'. Subthemes that emerged under the theme of the hospital as a place of care provision were '*Communication*', '*Teamwork*' and '*Quality Improvement*'.

4.1.4 Conclusion

Despite a challenging work environment, the safety culture in the hospital was considered to be generally positive. Medication incident reporting and interprofessional communication (IPC) emerged as targets for further work on improving patient safety in Irish healthcare.

4.2 Introduction

The past two decades have seen increasing interest in the measurement of safety culture within healthcare organisations.[3,126,127] Positive safety culture is associated with improved patient outcomes such as fewer patient safety incidents, urinary tract infections and hospital acquired-pressure ulcers. It is also associated with reduced patient mortality and increased patient satisfaction.[34,35,128,129] While conventional questionnaire-based studies and surveys, such as the SAQ and HSOPSC, are valuable in identifying areas for improvement and differences in safety culture attitudes between groups, a key limitation is that the reasons for these differences in attitudes cannot be explored in any detail using a questionnaire or a survey.[32,130] To date, the great majority of safety culture research has been survey-based. However, few qualitative studies have been carried out on the topic.

Ireland's healthcare system faces a number of major challenges related to both historic underfunding and the after-effects of the 2008 financial crisis.[79] Severe cutbacks in health expenditure in the 1980s led to the closure of thousands of hospital beds, and the number of hospital beds per 1000 people in Ireland is still below the OECD average (3.0 versus 4.7 in 2017).[79,80] In December 2019, 10,003 patients waited on a trolley for a hospital bed, an increase of 288% compared to December 2006.[125] Relatedly, there has been large-scale outward migration of Irish doctors since the 2008 global financial crisis, and Ireland currently has a relative shortage of doctors per 1000 people compared to other OECD countries (3.0 vs 3.5

in 2017).[76,79] Insufficient staffing and resources, combined with an ageing population, have put considerable strain on the Irish hospital system.[100]

The aim of this study is to gain a more comprehensive understanding of the patient safety culture in the acute hospital sector by focusing on a large acute Irish teaching hospital. This study adds to the literature by being the first qualitative interview study to examine patient safety culture in Irish healthcare.

4.3 Method

4.3.1 Study Design

Semi-structured face-to-face interviews were carried out with HCPs to explore their perceptions of the safety culture in the study hospital. This interview method was chosen as it allows detailed investigation into participants' personal perspectives of complex systems.[109] The COnsolidated criteria for REporting Qualitative research (COREQ) checklist was used to guide study reporting (**Appendix 4**).[131] Ethical approval was obtained from the Clinical Research Ethics Committee of the Cork Teaching Hospitals (**Appendix 5**). A topic guide was developed based on the six domains of the SAQ: *Teamwork Climate*, *Safety Climate*, *Job Satisfaction*, *Stress Recognition*, *Perceptions of Management* and *Working Conditions*, and also included questions on important patient safety issues and error reporting in the hospital.[45] The topic guide, displayed in **Table 4.1**, was refined after being pilot tested with two physicians, however these interviews were not included in the final data analysis.

Table 4.1: Topic Guide

No.	Question
1	How would you describe your job satisfaction at present?
2	How would you describe the quality of teamwork you experience within your profession/with members of other professions?
3	How would you describe the quality of communications you experience within your profession/with members of other professions?
4	How would you describe your working conditions? *Prompt: How do you think your working conditions affect patient safety?* *Prompt: Does stress affect your job performance?*
5	How would you describe the support you receive from hospital management on a day-to-day basis?
6	How committed do you think this hospital/clinical area is to patient safety? *Prompt: What is your role in maintaining patient safety?*
7	What do you think are the most important patient safety issues in the hospital at the moment?
8	How safe would you feel if you were being treated here as a patient? *Prompt: At what point during a hospital admission do you think a patient's safety is most at risk?*
9	How would you describe the error reporting culture in this hospital/clinical area?
10	How does the safety culture in this hospital compare to that in other hospitals you've worked in?

4.3.2 Setting

This study was carried out in a large acute teaching hospital in the southwest of Ireland, with tertiary referral designation. With over 40 medical and surgical specialities on campus, the hospital contains 810 beds and provides secondary and tertiary care for a catchment area of approximately 550,000 people.

4.3.3 Sampling

All HCPs, including physicians, nurses, HSCPs and HCAs, who had been working in a patient-facing role in the hospital for at least two months were eligible to take part

in the study. Participants were recruited using purposive sampling. A recruitment advertisement poster was sent via email to all staff in the hospital, inviting them to take part in the study. Maximum variation sampling was used to ensure variation in profession, clinical area of work, and professional grade; the sampling framework can be found in **Appendix 7**.

4.3.4 Data Collection

Seventeen interviews were carried out by the primary researcher at the study hospital between February and June 2019. The primary researcher had undergone training in qualitative interviewing and data analysis. There were no established working relationships between the research team and any study participants prior to study commencement. Before the interviews began, each participant was informed that the primary researcher was a pharmacist who was undertaking this study as part of her PhD work. Written informed consent was obtained from each participant before commencing the interview. Along with the questions set out in the topic guide, study participants were asked to state their profession, their clinical work area and how long they had been working in the hospital. To allow for the emergence of unanticipated and unprompted issues, the interview structure was not restricted to the topic guide, and the interviewer prompted and explored issues in more detail as appropriate. Field notes were recorded after each interview to inform data analysis. The method developed by Francis *et al*. was used to determine data saturation.[132] Interviews were audio-recorded after obtaining participants' written informed consent and were transcribed verbatim. All interviews consisted of one interviewer

and one interviewee and were recorded and transcribed using a Dictaphone® device. Interviews took place in a quiet and confidential space within the workplace campus of the HCP being interviewed. Interviews ranged in time from approximately 19 minutes to 33 minutes.

4.3.5 Data Analysis

The interviews were analysed using thematic analysis as described by Braun and Clarke.[113] Thematic analysis involves six phases, which were described in **Table 3.1**. Data familiarisation began during transcription of the interviews and by reading transcripts and field notes. Each transcript was coded by the primary author and a sample of transcripts was coded by a co-investigator. Relationships between the codes were explored and developed into themes by both researchers. The themes were named and defined, and disparities were identified and resolved, through discussion. QSR International's NVivo12 Plus® software was used to manage the qualitative data.[114]

4.3.6 Reflexivity

The researchers sought to address reflexivity while conducting this study. Both researchers are pharmacists, one is female and one is male, and at the time of the study both were PhD students in Clinical Pharmacy. Neither of the researchers were employed at the study site and they had no prior relationships with any of the study participants. Before and throughout the study, the researchers discussed their preconceptions about the research area. While both researchers felt that the safety

culture in the study hospital was likely to be negative, they acknowledged that they were unaware of the day-to-day experiences of staff in the hospital. For this reason, an inductive approach to data analysis was adopted.

4.4 Results

Two major themes were identified in the interview data:

1. The hospital as a **place of work/employment,** and
2. The hospital as a **place of care provision** (**Table 4.2**).

There was almost universal agreement among the interviewees that the hospital was committed to patient safety and that interviewees would feel safe being treated there as a patient themselves. This was in contrast with interviewees' comments on the hospital's poor infrastructure and insufficient staffing levels. The disparity in the identified themes highlighted the persistent difficulties experienced by HCPs with maintaining a positive safety culture in the context of an underfunded and under-resourced health system.

Table 4.2: Themes and Subthemes

Place of Work/Employment	**Place of Care Provision**
Hospital Environment	*Communication*
Staff Wellbeing	*Teamwork*
Error Reporting	*Quality improvement*

Three subthemes emerged under the theme of the hospital as a **place of work/employment**: '*Hospital Environment', 'Staff Wellbeing'* and *'Error Reporting'*.

4.4.1 *'Hospital Environment'*

Interviewees variously described the hospital environment as "*difficult"*, "*dangerous"*, *"negative*", and "*challenging*". Negative working conditions were frequently commented on: "*the very fabric of the building is…. kind of falling apart*" (HSCP 1). Interviewees mentioned a lack of necessary equipment, insufficient space to assess patients, and not having enough beds for patients requiring admission.

> "*I suppose what I find frustrating is how under-resourced the hospital is in terms of equipment*" (HSCP 2)

> "*We'd examine patients on the corridor, I talk with them standing up, in a corridor, because there's literally no space to see them in an exam room*" (Physician 1)

> "*I suppose we don't have enough beds, you know because we would have had 48 beds and we had to cut down to 31*" (Nurse 2)

The issue that was commented upon most frequently across the interviews was a lack of clinical staffing. Insufficient staffing levels were believed to contribute towards many of the other issues faced by hospital staff, such as stress and burnout, and to have a direct impact on patient safety.

> "*There's not enough staff to look after all the patients*" (Nurse 3)

> *"The biggest safety issues… I think it's got to be staffing levels, it has to be, because that impacts on every single other part of… if people are working too hard, and become too tired, exhausted,*

stressed, taking on too much at once, immediately you're going to start getting problems" (HSCP 1)

Interviewees often felt that they did not receive adequate support from hospital management. When asked what they would do differently if they were part of hospital management, several interviewees responded that they would communicate more with frontline staff to identify the issues and challenges that were important to them.

"*The general consensus on the ground in the staff is that hospital management don't support their staff*" (HSCP 2)

"*I'd be going around the different wards and the different departments, asking, you know, the questions that need to be asked about what can be done, what can we do to help*" (HSCP 1)

Staff also acknowledged that while poor working conditions had an impact on their job satisfaction, it was the patients who were most affected by the hospital environment.

"*The working conditions are horrific, and I suppose the point to make before I answer any further is that the conditions are even more horrific for the patients*" (Nurse 6)

4.4.2 *'Staff Wellbeing'*

As could be expected in any workplace, wellbeing emerged as an important subtheme amongst staff members. The issues of low staffing levels, patient

overcrowding and poor infrastructure discussed under the '*Hospital Environment*' subtheme contributed to varying levels of job satisfaction and morale.

> "*When overcrowding gets to a peak level… and the bed situation is at its worst, and maybe you have lots of ambulances waiting, and it's busy from an emergency point of view, the stress level, you can feel it, it's almost palpable in the air*" (Nurse 6)

These factors also contributed to stress amongst staff, although the majority of staff interviewed reported having moderate job satisfaction.

> "*I suppose maybe mid [scale], like five or 6 if were to put it on a scale of 1 to 10*" (HSCP 2)

Another common reason for poor staff wellbeing was an excessive workload, which was also thought to contribute to stress and burnout. Several interviewees reported low levels of morale amongst hospital staff, which they attributed to workload and stress.

> "*At the moment we're living at crisis level, so we just deal with the day to day… we're just treading water, keeping ourselves going*" (Nurse 5)

> *"Morale is ok in general but I feel like… people are seeing staff numbers go down, patient numbers go up… safe staffing levels are always a concern…. and I suppose that does get morale down"* (Physician 3)

Despite stress being a common issue amongst hospital staff, many interviewees were unaware of the presence of any support services for staff suffering from stress.

> "*I can't think of any strategies that are put in place to deal with stress, no*" (Physician 5)

Similarly, interviewees felt that stress and burnout had a negative impact on the quality of care they could provide to patients.

> "*A lot of the time you're really stressed and you feel like… you can't give the proper care, because of lack of staffing, and you're afraid that you're going to forget something, because it is so busy*" (Nurse 2)

4.4.3 *'Error Reporting'*

Attitudes towards error reporting differed between study participants. In general, staff felt that the concept of a no-blame reporting culture was becoming more prominent in the hospital, especially since the appointment of a medication safety pharmacist.

> "*I think the culture has changed so much. When I started you would have been hung out to dry if you made an ME. The culture has changed dramatically over the years, that we now look at that as a learning prospect*" (Nurse 1)

"*There's a medication safety pharmacist now, and she's pushing incident reporting of MEs, and there's been a two or three-fold increase in error reporting, which is great*" (Physician 3)

However, some interviewees also felt that they did not receive feedback or observe any actions being taken in response to their reports, and believed that improved feedback on error reports could increase reporting.

"*There's no feedback, you know, we would like to see [some] kind of feedback, and we would like to see the actions that were implemented, and the success or failure of that action"* (HSCP 5)

Staff held contrasting views regarding error reporting. Some interviewees considered reporting to be futile, or did not know how to report an incident.

"*Effectively nothing will happen, absolutely nothing, in fact, it will just put my blood pressure up, so better off not saying anything*" (Physician 1)

"*I actually don't know how to report an error*" (HSCP 6)

Other respondents felt that there was a good commitment to incident reporting in their clinical area.

"*We are very good at doing incident forms, you know, about near misses, and any kind of incidents here, medication incidents… yeah we're fairly into that*" (Nurse 2)

Three subthemes emerged under the theme of the hospital **as a care provider**: '*Communication'*, '*Teamwork'* and '*Quality Improvement'*.

4.4.4 *'Communication'*

The importance of communication in maintaining patient safety was a common topic in the interviews. Hospital staff acknowledged that poor communication can affect patient safety and patient care.

> "*Over the years, any occurrences, near misses, incidents, that I have been involved in or have been part of or heard about, when you break it down it all comes back to communication breaking down*" (HSCP 4)

Interviewees mentioned several types of communication that they felt were important. While communication within medical teams was considered key to ensuring patient safety during a hospital stay, communication with community healthcare services, including general practitioners (GPs), was equally important in maintaining patient safety once the patient had left hospital.

> "*If there isn't communication among team members, then there is going to be a slight kind of break in the link chain of the patient's actual clinical management, and that then could affect the patient safety in different ways*" (HSCP 5)

"*I suppose proper communication that ….if you send out a letter to a GP, that the GP gets it and that you know that the GP has gotten it*" (Physician 4)

The difficulties that hospital staff encountered in communication were both practical and social. Some interviewees found that they had difficulty contacting doctors *via* pager or the hospital switchboard, while others found that concerns about speaking up to more senior staff or other professions affected the quality of the communication they experienced.

"*Very difficult…. the staff directory is useless, trying to find the doctor you want, they don't answer their bleep*" (HSCP 6)

"*You'd always feel that, obviously, the doctors know a lot more, and they would always feel they would know a lot more, and even if you know a lot more than them, with something very specific, which is to do with the job, you'd often feel that it's not your place to tell them 'that's not right'*…" (HSCP 3)

4.4.5 '*Teamwork*'

The importance of teamwork in maintaining patient safety also emerged as a subtheme during the interviews. Teamwork was seen as an essential part of patient care, and although working in multidisciplinary teams (MDTs) could lead to conflicts due to differing priorities, the presence of different viewpoints was often helpful in finding solutions to problems.

"*I don't think the working day would work at all without every other member of the profession, and the MDT*" (Physician 3)

"*Probably the biggest difficulty is with* [a department] *that works closely with us. We do have some difficulties… they have different priorities to us*" (HSCP 1)

"*I think different specialities working together in one team offers different viewpoints and different, I suppose aspects of the patient's care, that one speciality alone mightn't notice, so I think that it's a positive impact on patient safety, strong teamwork*" (Physician 5).

Perceptions of teamwork also differed between study participants. While some staff members experienced a good level of teamwork in their clinical area, others felt more isolated.

"*My team here, you can see it on a daily basis, they're coming out and checking each room, 'I'm free now. Do you want me to help with anything?', and that works very, very well*" (Nurse 4)

"*I don't think our teamwork is great, I'll be honest with you. I think we work very much in silo in* [our] *department*" (HSCP 2)

The size of the department the study participant was working in, and the staffing levels in that department, seemed to influence their perceptions of teamwork quality.

"*It's a small environment, we work for the same team of anaesthetists and consultants, so, there's a good team here who are*

here a long time. There's no, what's the word, breakdown, communication is good between staff" (Nurse 3)

"*But the level of that teamwork will vary, so in my own experience, a lot of the time we're working alone. That's very detrimental to quality of care because you've no support, you've no one to bounce an idea off, you've no one to technically help you with something that's technically challenging, that might require two people*" (Nurse 6)

4.4.6 *'Commitment to Safety'*

Despite frequently mentioning the poor conditions for both staff and patients in the hospital, a subtheme that emerged from the data was that staff considered the hospital to be committed to patient safety.

"*I have no doubt that it's committed. I think under financial [constraints] it does a very good job*" (Nurse 1)

Staff mentioned ways in which patient safety was being improved, such as the creation of new, safety-focussed staff roles, developing protocols and procedures, and carrying out ward-level initiatives. One study participant described how a 'safety pause' had been introduced on her ward, in which staff gather every day for a maximum of five minutes to discuss patient safety issues on the ward.[133]

"*We now have a quality assurance person full time.*" (HSCP 1)

"*We write a lot of clinical guidelines online here, we have lots of these things, so we're always trying to deal as safely as possible*" (Physician 1)

"*Three or four years ago we introduced a safety pause at our handover in the morning*" (Nurse 2)

They also mentioned other ways in which they felt patient safety could be improved, such as improving access to patient data, and holding discussion forums for frontline staff.

"*I think that you could generate so much research and patient quality improvement initiatives, if you could collect your data.*" (Physician 4)

"*An open forum would be probably one of the most proactive and realistic things that could be done for people to identify issues at ward level, or at hospital level, to flag patient safety events*" (Physician 3)

The data revealed a hardworking, committed hospital staff striving to provide high quality care to patients in a resource-strained environment.

"*I suppose we are remarkable in that as a group of people within the hospital in a resource-limited setting, with huge patient numbers and decreasing staff numbers we still [can say that] everyone has a real focus on patient care*" (Physician 3)

4.5 Discussion

Recent literature has depicted an overwhelmingly negative image of Irish healthcare. In 2018, the European Commission expressed concerns about the cost-effectiveness and sustainability of the Irish health system.[134] In the same year, Turner discussed how, despite spending the fifth highest amount per capita on health in the world, historic underspending coupled with the effects of financial austerity was contributing to poorer clinical outcomes for many common conditions, longer patient waiting lists and overcrowding in Irish hospitals.[79] Humphries *et al.* described the culture of medical migration in the country and how conditions in Irish hospitals were influencing doctors' decisions to remain abroad rather than return to take up senior posts in Ireland.[135] Furthermore, Hayes *et al.* found that one third of Irish doctors experience burnout due to a suboptimal work environment.[78] The HSE in Ireland has acknowledged that the 2008 financial crisis led to major consultant recruitment and retention difficulties. In February 2019, a three-day strike was held by the Irish Nurses and Midwives Organisation (INMO) over the issue of pay, which was claimed to be causing staff retention issues.[124,136] In a 2019 study by Gallen *et al.*, two thirds of nurses and midwives surveyed stated that they were not engaged in quality and safety as part of their clinical practice.[137]

Many of the issues most commonly reported by participants of this study, such as poor working conditions and staff wellbeing, can be attributed to insufficient or

inappropriate healthcare spending. However, study participants were also found to have largely positive perceptions of the safety culture in the hospital.

Study participants recognised the importance of teamwork and communication on patient safety, possibly due to the increased emphasis that has been placed on communication and MDTs in recent years.[138,139] Most interviewees considered patient safety to be an integral part of their job, were passionate about initiatives to improve patient safety in their clinical area and were aware of the barriers to safe patient care. Many interviewees felt that ME reporting was an important part of maintaining patient safety and that attitudes towards error reporting had improved in recent years. This could be attributed to campaigns such as the WHO GPSCs, or the rising popularity of concepts such as a blame-free reporting culture.[3,72] However, a small number of interviewees remained resistant towards error reporting and open disclosure. This could be attributed to a sense of futility regarding the incident reporting process, and to the country's challenging medico-legal culture.[111,140]

Although hospital management was considered to be committed to maintaining and improving patient safety, study participants were critical of the lack of engagement between hospital management and frontline staff. Issues such as low morale and generally moderate job satisfaction amongst staff were also considered to be connected to cutbacks, evidenced by the INMO strikes in February 2019.[124] Low morale was further compounded by poor availability of, or knowledge regarding,

support services for staff suffering from stress and burnout, despite the increasing prevalence of burnout across HCPs in Ireland.[78,94,95]

The results of this study were largely consistent with those of **Chapters 2** and **3**, where staff considered the teamwork climate and safety climate in the hospital to be positive, had generally good job satisfaction, recognised the impact of stress on patient care, and felt that working conditions and support from management could be improved. Although the qualitative literature on patient safety culture is limited, the results of this study are comparable to those found by research groups in other countries and settings. Boussat *et al.* conducted interviews on safety culture with 19 healthcare providers at a university hospital in France.[41] Staffing and support from hospital management were frequently mentioned topics; staff complained that staff shortages and workload were contributing to fatigue, stress, and a decrease in patient safety. Organisational issues and problems with communication between departments were also mentioned often. Ederer *et al.* carried out interviews with 14 midwives from Austria, Germany and Switzerland.[141] The midwives described how, despite the importance they placed on patient safety, institutional circumstances such as support from management and inter-professional communication could prevent the integration of patient safety into their everyday work. The parallels between the results of these studies and those presented in this chapter indicate that the same patient safety issues are faced in many clinical settings, regardless of size or location.

A limitation of the present study is that the use of email to recruit study participants may have introduced selection bias, as not all staff members check their email accounts regularly. Selection bias may also have been introduced by the fact that staff with a prior interest in patient safety may have been more likely to take part in the study, and the staff members worst affected by understaffing and excessive workload may have been unable to take the time to participate. The major strength of this study is the variety in the study participants in terms of professional role, seniority and years of experience in the study hospital. This variety provided diverse insights into the safety culture in the hospital and the different experiences of HCPs in the study hospital.

4.6 Conclusion

Chronic under-resourcing and ongoing staffing problems have led to poor working conditions and low staff morale in Irish hospitals, which can have an impact on the safety culture of an organisation. The HCPs interviewed in this study expressed very clearly the stress caused by these poor working conditions, and the impact that chronic stress can have on both staff wellbeing and patient safety. Despite these difficulties, the interviewees had generally positive perceptions of the safety culture in the hospital. Hospital staff recognised the importance of teamwork and communication in maintaining patient safety and were committed to providing the best possible care for their patients. Future research on safety culture and patient safety, both in Ireland and abroad, must recognise the restrictions and pressures put on staff working in such a resource-limited environment.

Chapter 5 : Interventions to Improve Reporting of Medication Errors in Hospitals: A Systematic Review and Narrative Synthesis

Publication:

The work described in this chapter has been published as the following peer reviewed paper:

Gleeson L, Dalton K, O'Mahony D, Byrne S. Interventions to improve reporting of medication errors in hospitals: A systematic review and narrative synthesis. *Res Soc Adm Pharm*. 2020;16(8):1017–25.

5.1 Abstract

5.1.1 Aim

In order to learn from MEs and prevent their recurrence, it is essential that MEs are reported when they occur. The aim of this systematic review was to identify studies in which interventions were deployed in hospitals to improve ME reporting, to summarise the findings of these studies, and to make recommendations for future investigations.

5.1.2 Methods

A comprehensive search of five electronic databases (PubMed, Medline (OVID), Embase (OVID), Web of Science, and CINAHL) was conducted from inception up to and including December 2018. Studies were included if they described an intervention aiming to increase the reporting of MEs by HCPs in hospitals and excluded if there was no full-text English language version available, or if the reporting rate in the hospital prior to the intervention was not available. Data extracted from included studies were described using narrative synthesis.

5.1.3 Results

Of 12,025 identified studies, seventeen were included in this review - fifteen uncontrolled before-versus-after studies, one survey and one non-equivalent group controlled trial. Five studies carried out a single intervention and twelve studies conducted multifaceted interventions. Intervention types were mapped to the Effective Practice and Organisation of Care (EPOC) taxonomy. The most common

intervention types were critical incident reporting, implemented in fifteen studies, and audit and feedback, implemented in seven studies. Other intervention types included educational materials, educational meetings, and role expansion and task shifting. As only one study compared a control and intervention group, the effectiveness of the different intervention types could not be evaluated.

5.1.4 Conclusion

This is the first review to address the evidence on interventions to improve ME reporting in hospitals on a global scale. The review identified interventions that were implemented without evidence of their effectiveness. Due to the essential role played by incident reporting in learning from and preventing the recurrence of MEs, further research is required to examine the efficacy of this type of intervention for ME prevention.

5.2 Introduction

MEs, defined as '*any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer*', can occur at any stage in the prescribing, preparation, dispensing and administration of medicines.[105,142] A leading source of avoidable harm in healthcare worldwide, MEs are associated with an annual global cost of US$42 billion and currently represent the 3rd leading cause of death in the US.[6,143] The scale of the problem is even larger in lower income countries, where patients experience twice as many disability-adjusted life years lost due to medication-related harm than those in high income countries.[72]

In 2017, the WHO announced its third GPSC - '*Medication Without Harm*' - which aspires to reduce the global rate of MEs by 50% in five years.[73] The nature of MEs makes it difficult to estimate their prevalence accurately or the level of harm they can cause. The underreporting of MEs has been described, quantitatively and qualitatively, across various healthcare settings worldwide.[144–148] Several factors contribute to ME underreporting, including fear of medico-legal reprisal, an impractical or burdensome reporting process and a lack of feedback on reported errors.[149–151] Along with ambiguity over the definition of an ME, healthcare providers may disagree over whether or not an error has occurred at all.[151]

In order to learn from MEs and prevent their recurrence, an effective system for reporting these errors is essential.[3] It is now widely acknowledged that error

reporting and analysis are key to improving patient safety, and high error reporting rates are considered indicative of a positive safety culture, rather than an unsafe healthcare environment.[150,151] In recent years, however, there has been debate over the effectiveness of incident reporting, with authors citing issues such as reporting bias, lack of feedback, and fear of blame as reasons why incident reporting has not led to a significant decrease in adverse events.[152–154] Despite the important role played by incident reporting in improving patient safety, to date no review has been carried out to address the evidence on ME reporting in hospitals on a global scale.

The aim of this systematic review was to identify and summarise the studies investigating interventions to improve ME reporting in hospitals.

5.3 Methods

This review was carried out in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[155] A protocol for this review was registered in advance with the International Prospective Register of Systematic Reviews (PROSPERO) with the registration number CRD42018116868.

5.3.1 Search Strategy

Studies were included in the systematic review if they investigated any intervention or strategy conducted in a hospital setting which aimed to increase the reporting of MEs, including randomised controlled trials, non-randomised controlled trials, controlled before versus after studies, and uncontrolled before versus after studies.

Studies were excluded if:

- No information was provided regarding the ME reporting rate in the hospital prior to the intervention.
- No full-text English language version of the study was available.
- The study was a conference abstract and no full-text version was available.

An electronic search was conducted using the following databases from inception up to and including December 2018: PubMed, Medline (OVID), Embase (OVID), Web of Science, and CINAHL. The search strategy focused on three concepts: MEs, reporting, and the hospital setting. A search strategy was developed in PubMed around these concepts and appropriate Medical Subject Headings (MeSH) were used. For each of

the remaining databases, the search strategy was modified to suit their specific search capabilities if necessary. A copy of the search strategy for each database is available in **Appendix 8**. In addition, the reference lists of included papers were searched for potentially eligible studies.

5.3.2 Study Selection

In the first stage of study selection, one reviewer (LG) screened the electronic search results to eliminate studies that were clearly not pertinent to our review. In the second stage, two reviewers (LG and KD) screened the titles and abstracts to identify potentially relevant studies. In the third stage, the full texts were independently assessed by both reviewers to determine their eligibility. Consensus on inclusion in the final two stages was reached by discussion between the two reviewers. Authors of five studies were contacted to request data, however no reply was received from any of the authors, and therefore these studies were not included.[156–160]

5.3.3 Data Extraction and Analysis

Data were extracted using a dedicated extraction form, with the following headings: author, year, study design, setting, study aim, intervention type, and ME reporting rates before and after implementation of the intervention. The intervention types used in each study were mapped to the EPOC taxonomy, which is split into four main domains of interventions: *Delivery Arrangements*, *Financial Arrangements*, G*overnance Arrangements*, and *Implementation Strategies*.[161] Where possible, to allow comparison between the studies, the mean monthly reporting rate before and

after the interventions were implemented was calculated for each study. Due to heterogeneity across the studies, a meta-analysis was not possible, therefore a systematic, narrative approach was adopted to synthesise the results. The Economic and Social Research Council (ESRC) Guidance on the Conduct of Narrative Synthesis in Systematic Reviews was followed in conducting the narrative synthesis.[162] The data from each study were tabulated to search for patterns and relationships across the studies; a primary synthesis was carried out to elucidate these patterns, which was then developed into a meaningful narrative.

5.3.4 Critical Appraisal

The Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for Quantitative studies was used to assess selection bias, study design, confounders, and data collection methods for the included studies.[163] Given the nature of the included studies, blinding of outcome assessors and study participants was not possible, and reporting of withdrawals and drop-outs was not applicable, therefore these criteria were not included in the critical appraisal. Each study was evaluated by two reviewers (LG and KD) and disagreements were resolved by consensus.

5.4 Results

5.4.1 Search Results

A total of 12,025 records were identified through electronic database searching. After the exclusion of records based on their titles and abstracts, as well as the removal of duplicates, sixty-six full texts were assessed for eligibility (including seven studies which had been identified by citation searching). Seventeen published papers were suitable for inclusion in the final review. A PRISMA flow diagram describes the flow of studies in the review (**Figure 5.1**).

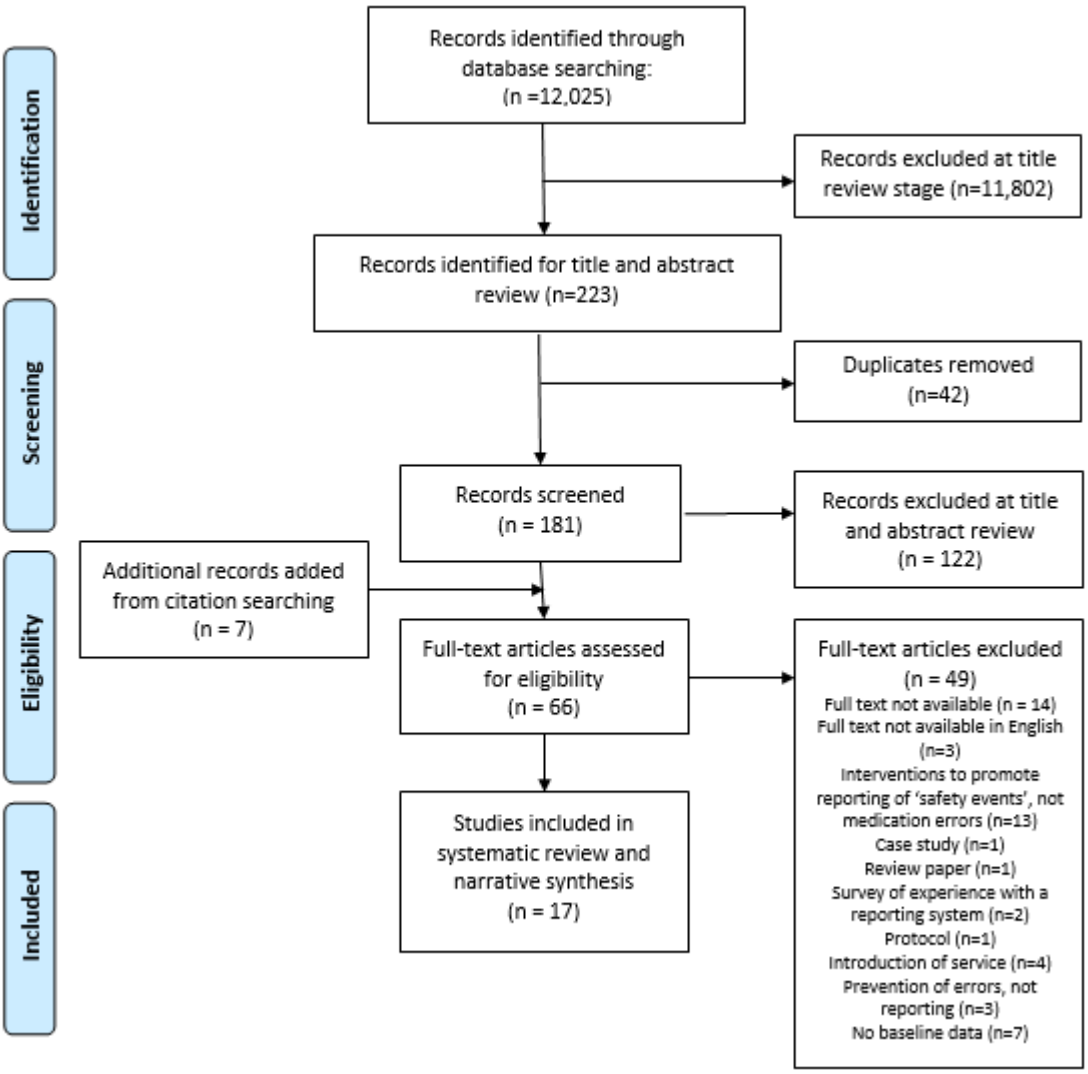

Figure 5.1: PRISMA Flow Diagram

5.4.2 Characteristics of Included Studies

The characteristics of the seventeen included studies are summarised in **Table 5.1**.[122,164,173–179,165–172] Further characteristics and results of the interventions carried out in each study are provided in **Table 5.2**.[122,164,173–179,165–172] Ten of the included studies were conducted in the USA,[122,167] two in Spain,[169,175] and one each in Saudi Arabia,[165] Australia,[166] the UK,[171] Japan,[173] and Ireland.[176] All of the studies were carried out at a single site, apart from one study which was carried out across 550 hospitals in the USA, and one which was carried out across 6 Australian hospitals.[166,177]

In terms of study aim, the included studies can be divided into two groups:

1) Studies that assessed the efficacy of interventions to improve ME reporting.[122,164,166,167,169,175]
2) Studies that described the implementation of a new system for reporting MEs.[165,168,170,171,173,174,176–179]

Every study measured the rate of medication incident reporting before and after a change had been implemented, however some studies also measured the rates of medication incidents with harm,[164,165] or the level of harm caused by medication incidents.[122,171,174] Although what was reported in each study fell under the definition of MEs adopted by this review, the studies differed in terms of what was reported, and how this was defined. 'Medication errors' were reported in six studies,[122,164,167,169,176,177] 'medication events' were measured in two studies,[171,172]

and ‘medication incidents’ were reported in two studies.[165,173] Seven studies did not provide a definition for what was being reported.[122,172–174,176–178]

Fifteen of the studies were uncontrolled before-versus-after studies,[122,164,175,176,178,179,165,167–169,171–174] one was a non-equivalent group controlled trial,[166] and one was a survey study.[177] Five studies carried out a single intervention;[168,172,174,177,178] the other twelve studies involved multifaceted interventions.[122,164,176,179,165–167,169–171,173,175] The studies also varied in how the interventions were developed. Three studies held group strategy sessions,[164,172,179] two studies conducted focus groups,[166,167] and one study used a survey to inform the development of the intervention.[170] The remaining studies either based their interventions on the literature,[169,173] or did not describe how the intervention was developed.[122,165,168,171,174–178] Data were gathered using a reporting form in each study, although the data gathered on the reporting forms varied across the studies.

Table 5.1: Study Characteristics

Study Author (Year)	Setting	Study Design	Study Aim	Intervention	EPOC Intervention Subcategory
Abstoss *et al.* (2011)[164]	ICU, university children's hospital, USA	Uncontrolled before versus after study	To analyse the patterns in reporting rates of MEs and rates of MEs with harm in the context of medication safety interventions	Poster Tracking Days Since Last Error	Monitoring the performance of the delivery of healthcare
				Quality Improvement Channel	Educational Materials
				Quality Improvement Curriculum	Educational Meetings
				ME Emails	Audit and Feedback
				Medication Manager' Programme	Role expansion or Task Shifting
				Patient Safety Report Form Revisions	Critical Incident Reporting
Arabi *et al.* (2011)[165]	Intensive care department, university-affiliated tertiary care centre, Saudi Arabia	Uncontrolled before versus after study	To describe the experience of implementing a Comprehensive Management System for incident reports	Comprehensive Management System	Critical Incident Reporting
				Feedback to staff	Audit and feedback
				Quality and Safety Forum	Communities of practice
		Uncontrolled before	To study the effects of a pharmacist-led paediatrics medication safety	New Reporting System	Critical Incident Reporting

Study Author (Year)	Setting	Study Design	Study Aim	Intervention	EPOC Intervention Subcategory
Costello *et al.* (2007)[122]	Critical care centre, children's hospital, USA	versus after study	team on the frequency and severity of MEs reported	Clinical Pharmacist	Staffing Models
				Paediatric Medication Safety Team	Role expansion or Task Shifting
				Monthly Focus Groups	Communities of practice
Evans *et al.* (2007)[166]	Two regional hospitals, Australia	Non-equivalent group controlled clinical trial	To assess the effectiveness of an intervention package in order to improve incident reporting rates and change the types of incidents reported.	Educational Manual	Educational Materials
				Redesign of Reporting Systems	Critical Incident Reporting
				Feedback newsletters	Audit and Feedback
				Educational Sessions	Educational Meetings
Force *et al.* (2006)[167]	Community hospital, USA	Uncontrolled before versus after study	To build a non-punitive culture and to increase ME reporting	Medication Event Team	Role expansion or Task Shifting
				Lifesavers' project	Audit and Feedback
					Educational Materials
					Organisational Culture
					Educational Meetings
				New reporting system	Critical Incident Reporting

Study Author (Year)	Setting	Study Design	Study Aim	Intervention	EPOC Intervention Subcategory
France *et al.* (2003)[168]	Paediatric chemotherapy pharmacy and inpatient paediatric oncology units, university hospital, USA	Uncontrolled before versus after study	To present the conceptual model of a Chemotherapy Incident Reporting and Improvement System	Chemotherapy Incident Reporting and Improvement System	Critical Incident Reporting
				Feedback	Audit and Feedback
Guerrero-Aznar *et al.* (2013)[169]	Paediatrics management unit, hospital, Spain	Uncontrolled before versus after study	To analyse the impact on error notification of the implementation of a decentralised multidisciplinary safety committee and a networked computer application for ME reporting.	New Reporting System	Critical Incident Reporting
				Safety Committee	Role expansion or Task Shifting
				Feedback to staff	Audit and Feedback
Guffey *et al.* (2011)[170]	Anaesthesia department, children's hospital, USA	Uncontrolled before versus after study	To implement a near miss reporting system	New Reporting System	Critical Incident Reporting
Haw *et al.* (2011)[171]	Psychiatric hospital, UK	Uncontrolled before versus after study	To describe the first 2 years of operation of an electronic system for reporting medication events in psychiatry.	New Reporting System	Critical Incident Reporting

Study Author (Year)	Setting	Study Design	Study Aim	Intervention	EPOC Intervention Subcategory
Lehmann *et al.* (2007)[172]	University hospital, USA	Uncontrolled before versus after study	To 'develop monitoring systems to decrease the potential for drug harm'	New Reporting System	Critical Incident Reporting
Nakajima *et al.* (2005)[173]	University hospital, Japan	Uncontrolled before versus after study	To 'introduce a hospital-wide incident reporting system to collect data on variant practices, build an organisational structure for activities aimed at patient safety, and implement staff education and system oriented improvements'	New Reporting System	Critical Incident Reporting
				New organisational structure	Role expansion or Task Shifting
				Educational Seminars	Educational Meetings
				Feedback	Audit and Feedback
Nast *et al.* (2005)[174]	Cardiothoracic ICU and cardiothoracic post anaesthesia care units, university hospital, USA	Uncontrolled before versus after study	To 'evaluate a new mechanism for reporting and classifying patient safety incidents to increase reporting and identify patient safety priorities'	New Reporting System	Critical Incident Reporting
Ramirez *et al.* (2018)[175]	University hospital, Spain	Uncontrolled before	To assess which improvement actions were successful in reducing near-misses or adverse events	Training workshops	Educational Meetings
				Improvement Actions'	Continuous Quality Improvement

Study Author (Year)	Setting	Study Design	Study Aim	Intervention	EPOC Intervention Subcategory
		versus after study			
Relihan *et al.* (2009)[176]	University hospital, Ireland	Uncontrolled before versus after study	To develop an online ME reporting system	New Reporting System	Critical Incident Reporting
				Medication Safety Officer	Staffing Models
				Multiple Education and Training Initiatives	Educational Materials
Savage *et al.* (2005)[177]	550 hospitals, USA	Survey	To evaluate the utility of an online ME reporting programme	New Reporting System	Critical Incident Reporting
Smith *et al.* (2006)[178]	University Medical Centre, USA	Uncontrolled before versus after study	To develop 'online adverse drug reaction (ADR) and ME reporting systems'	New Reporting System	Critical Incident Reporting
Stump *et al.* (2000)[179]	University hospital, USA	Uncontrolled before versus after study	To implement a 'standardized, non-punitive medication use variance process'	New Reporting System	Critical Incident Reporting

Table 5.2: Further Study Characteristics and Results of Interventions

Study Author (Year)	What was reported	How it was defined	Near Misses Included	Pre-intervention reporting rates	Post-intervention reporting rates
Abstoss *et al.* (2011)[164]	MEs	Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer	Yes	3.12 reports per 10,000 doses dispensed	4.08 per 10,000 doses dispensed
Arabi *et al.* (2011)[165]	Incidents	An undesired event that might affect a patient, employee, family member, visitor, equipment, or property, and that was not consistent with standard operations or care. These events might cause actual injury, or might have the potential to cause injury, loss of function, or death.	Yes	Mean 27.4 reports per month	Mean 95.4 reports per month
Costello *et al.* (2007)[122]	MEs	None provided	Yes	Mean 4.5 reports per month	Mean 27.3 reports per month
Evans *et al.* (2007)[166]	Adverse Events	Unintended injury caused by healthcare management rather than the patient's disease	Yes	Control:54.5 reports per 10,000 observable bed days (OBDs)	Control:101.0 reports per 10,000 OBDs Intervention: 189.6 reports per 10,000 OBDs

Study Author (Year)	What was reported	How it was defined	Near Misses Included	Pre-intervention reporting rates	Post-intervention reporting rates
				Intervention:82.8 reports per 10,000 OBDs	
Force *et al.* (2006)[167]	MEs	Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.	Yes	Mean 14.3 reports per month	Mean 72.5 reports per month
France *et al.* (2003)[168]	Near Misses and Preventable Adverse Drug Events (ADEs)	Medical error: the failure of a planned action to be completed as intended or the use of the wrong plan to achieve an aim; Adverse event: an injury or a laboratory abnormality that a patient experiences as a result of their medical management and not their underlying disease, Preventable adverse event: An adverse event attributed to medical error, near miss: a medical error that does not lead to an adverse event	Yes	53 reports in 657 admissions	93 reports in 818 admissions
Guerrero-Aznar *et al.* (2013)[169]	MEs	Any preventable incident that may harm the patient or result in the inappropriate use of a drug	Yes	Mean 1±1 reports per month	Mean 5±3 reports per month

Study Author (Year)	What was reported	How it was defined	Near Misses Included	Pre-intervention reporting rates	Post-intervention reporting rates
Guffey *et al.* (2011)[170]	Near Misses	An event that did not cause patient harm, but had the potential to	Yes (near misses only)	Mean 1.33 reports per month	Mean 50 reports per month
Haw *et al.* (2011)[171]	Medication Events	MEs, near misses, and ADRs	Yes	Mean 1.4 reports per month	Mean 18.6 reports per month
Lehmann *et al.* (2007)[172]	Medication Events	None provided	No	Mean 19 reports per month	Mean 102 reports per month
Nakajima *et al.* (2005)[173]	Incidents	None provided	No	Mean 45 reports per month	Mean 177 reports per month
Nast *et al.* (2005)[174]	Patient Safety Events	None provided	Yes	8.5 reports per 1000 patient-days	25.3 events per 1000 patient-days
Ramirez *et al.* (2018)[175]	Patient Safety Incidents	An event during an episode of patient care that had the potential to or actually caused injury or harm to the patient.	Yes	Mean 20 reports per month	Mean 80 reports per month
Relihan *et al.* (2009)[176]	MEs	None provided	Unclear	Mean 31.7 reports per month	Mean 75.4 reports per month

Study Author (Year)	What was reported	How it was defined	Near Misses Included	Pre-intervention reporting rates	Post-intervention reporting rates
Savage *et al.* (2005)[177]	MEs	None provided	Unclear	Mean 32±47 reports per month	Mean 60±88 reports per month
Smith *et al.* (2006)[178]	ADRs and MEs	None provided	Unclear	Mean 6.7 reports per month	Mean 37.3 reports per month
Stump *et al.* (2000)[179]	Medication Use Variance	Departure from clinical pathways	Yes	Mean 23.7 reports per month	Mean 31.4 reports per month

5.4.3 Critical Appraisal

Of the 17 included studies, sixteen were found to be of moderate methodological quality.[122,164,174–176,178,179,165–170,172,173] Fifteen studies were uncontrolled before-versus-after studies, which did not account for confounders but used a valid and reliable data collection method.[122,164,175,176,178,179,165,167–170,172–174] These 15 studies received a moderate score for selection bias and study design, a weak score for confounders and a strong score for data collection method, resulting in a moderate global methodological quality rating. The non-equivalent group-controlled trial carried out by Evans *et al.* reported heterogeneity between the control and intervention groups at baseline resulted in a weak score for confounders and a moderate quality overall.[166] The study carried out by Savage *et al.* used a survey to measure changes in medication reporting which had a low response rate and was therefore deemed to be methodologically weak.[177] The results of the critical appraisal are presented in **Table 5.3**.

Table 5.3: Critical Appraisal

Study Author (Year)	**Selection Bias**	**Study Design**	**Confounders**	**Data Collection Method**	**Global Rating**
Abstoss *et al.* (2011) [28]	Moderate	Moderate	Weak	Strong	Moderate
Arabi *et al.* (2011)[29]	Moderate	Moderate	Weak	Strong	Moderate
Costello *et al.* (2007) [37]	Moderate	Moderate	Weak	Strong	Moderate
Evans *et al.* (2007)[38]	Moderate	Moderate	Weak	Strong	Moderate

Study Author (Year)	Selection Bias	Study Design	Confounders	Data Collection Method	Global Rating
Force *et al.* (2006)[39]	Moderate	Moderate	Weak	Strong	Moderate
France *et al.* (2003)[40]	Moderate	Moderate	Weak	Strong	Moderate
Guerrero-Aznar *et al.* (2013)[41]	Moderate	Moderate	Weak	Strong	Moderate
Guffey *et al.* (2011)[42]	Moderate	Moderate	Weak	Strong	Moderate
Haw *et al.* (2011)[43]	Moderate	Moderate	Weak	Strong	Moderate
Lehmann *et al.* (2007)[44]	Moderate	Moderate	Weak	Strong	Moderate
Nakajima *et al.* (2005)[30]	Moderate	Moderate	Weak	Strong	Moderate
Nast *et al.* (2005)[31]	Moderate	Moderate	Weak	Strong	Moderate
Ramirez *et al.* (2018) [32]	Moderate	Moderate	Weak	Strong	Moderate
Relihan *et al.* (2009) [33]	Moderate	Moderate	Weak	Strong	Moderate
Savage *et al.* (2005)[34]	Moderate	Weak	Weak	Strong	Weak
Smith *et al.* (2006)[35]	Moderate	Moderate	Weak	Strong	Moderate
Stump *et al.* (2000)[36]	Moderate	Moderate	Weak	Strong	Moderate

Global ratings: Strong = No weak ratings, Moderate = One weak rating, Weak = Two or more weak ratings

5.4.4 Interventions

The interventions implemented in each of the studies were mapped to the EPOC taxonomy for healthcare interventions.[161] The most common intervention type was critical incident reporting, which was implemented in fifteen of the included

studies,[122,164,176,177,179,166–170,172–174] followed by audit and feedback, which was implemented in seven studies.[164–166,169–171,173]

Critical incident reporting: Critical incident reporting interventions were implemented in 15 of the included studies.[122,164,176,177,179,166–170,172–174] Thirteen studies implemented a new reporting system,[164,167,179,168–170,172–174,176,177] while two studies made revisions to existing reporting systems.[122,166]

There was variability across the studies in terms of the format of the reporting system (i.e. web-based or paper-based), whether or not it was anonymous, and whether or not training was provided to hospital staff. Nine of the studies used a web-based reporting system,[164,168–171,173,176–178] and six used a paper-based system.[122,166,172,174,179] All web-based systems were accessible from a hospital computer, with the exception of the France *et al*. study, in which medication incidents could be reported using a handheld device.[168] Abstoss *et al*. revised their existing online reporting system from a multi-page form into a single quick submission form.[164] With regard to paper-based systems, Force *et al*. stored the reporting forms on a wall-mounted rack in nursing units in the study hospital.[167] Both Nast *et al*. and Stump *et al*. designed reporting forms that could be stored in a pocket or on a clipboard until they needed to be used.[174,179] In the study by Costello *et al*., completed forms were placed in a box, and reviewed each month.[122] Evans *et al*. reduced their 3-page form to one page to reduce reporting burden, and also introduced a free telephone service where staff could report incidents at any time to

a registered nurse.[166] Lehmann *et al*. did not give any details on their reporting form, other than the fact that it was paper-based.[172]

All but three reporting systems were anonymous.[167,171,178] In the study by Smith *et al*., staff using the online reporting system had to give their contact information for any necessary follow-up.[178] Similarly, in the study by Force *et al*., the person involved in the ME had to include their name, submit the medication event form and provide the form to their patient unit team leader to be signed off. It was felt that anonymous reporting would prevent 'valuable follow-up procedures' from being carried out.[167] In contrast, in the study by Haw *et al*., staff members completing the incident report were asked to give their names, but the staff member involved in the incident was not required to do so.[171] Stump *et al*. noted that a paper-based form was used to create a truly anonymous system, due to the possibility of tracing web-based reports.[179] This issue was acknowledged by Guffey *et al*., who implemented a 'secure' online reporting system in the paediatric anaesthesia department of a US hospital, however details were not provided on how the system was secured.[170]

Training was provided in how to use the new reporting system was provided to hospital staff in four of the studies.[167,171,172,179] Haw *et al.* provided staff with a guidebook on how to report errors and included an 'e-help function' in their web-based reporting system.[171] Lehmann *et al.* conducted a 'major education initiative' before the launch of their reporting system, which involved explaining the system to nurse managers.[172] Force *et al.* provided staff with ongoing education on how to

complete incident forms and the importance of reporting errors.[167] In-service education programs were carried out by Stump *et al*. during implementation of their new reporting system.[179]

Two of the included studies encouraged the use of their new reporting system by rewarding event reporting.[167,172] Lehmann *et al*. awarded the nursing unit that reported the greatest number of events with certificates of merit and educational materials.[172] Force *et al*. gave a personal 'thank-you' note and a gift card to staff who used the new reporting system.[167]

Audit and feedback: Seven studies used audit and feedback to encourage reporting and promote a non-punitive culture.[144,165,166,169,170,173] Abstoss *et al.,* Evans *et al*. and Guerrero-Aznar *et al*. sent emails to staff containing summaries of recent reports and quality improvement actions.[164,166,169] Guffey *et al*. sent a summary report of all 'near misses' to staff at regular intervals.[170] In the study by Haw *et al*., an analysis of reported errors was sent out to staff one year after the implementation of the new reporting system.[171] Arabi *et al*. provided feedback to staff at departmental meetings.[165] Nakajima *et al*. made feedback available to staff through newsletters, meetings and seminars.[173]

Educational materials: Three studies used educational materials to promote a non-punitive culture and encourage further reporting.[164,166,167] Abstoss *et al*. displayed a

'quality improvement' channel on a television screen in the staff room, which included content such a performance metrics, lessons learned, and education on quality improvement and patient safety.[164] Evans *et al*. distributed a manual to staff to improve knowledge of reportable events.[166] Force *et al*. sent out newsletters and flyers with research-based information on a non-punitive culture.[167]

Educational meetings: Educational meetings were carried out in nine of the included studies.[122,164,165,167,173,175,176,179,180] Abstoss *et al*. held three 'mini-symposia' to provide frontline staff with information on medication safety and reporting.[164] Arabi *et al*. presented lectures about 'just culture' and high risk events to hospital frontline staff.[165] Costello *et al*. provided education to healthcare providers during patient rounds.[122] Evans *et al*. held educational sessions during existing departmental meetings.[166] Force *et al*. organised small group forums in which attending staff nurses and pharmacists could learn how MEs occur.[167] Nakajima *et al*. included educational seminars three times a year.[173] During the implementation of a new reporting system, Ramirez *et al*. performed ten training workshops with hospital staff on patient safety.[175] Stump *et al*. carried out in-service education programs for hospital staff, and Relihan *et al*. carried out 'multiple education and training initiatives' but did not give further details.[176,179]

Role expansion and task-shifting: Staff roles were expanded in six studies.[122,164,165,167,169,173] Arabi *et al.* set up a multidisciplinary 'Incident Reports Committee' to review, analyse and close incident reports, led by a physician, and

including members from nursing and pharmacy.[165] Abstoss *et al.* set up a 'medication manager programme' in which pharmacy technicians provided medication management services.[164] Force *et al.* created a medication event team that was responsible for analysing reports.[167] Costello *et al.* set up a paediatrics medication safety team.[122] Guerrero-Aznar *et al.* established a decentralised multidisciplinary safety committee which was responsible for analysing reports made to the new system and developing improvement strategies based on this analysis.[169] Nakajima *et al.* set up a new organisational structure for patient safety, comprised of (i) a clinical risk management committee, who analysed incident reports and develop improvement plans, (ii) a department of clinical quality management, which acted on the plans made by the committee, and (iii) an area clinical risk manager, who oversaw quality of care in their clinical area.[173]

Staffing Roles: Costello *et al.* introduced a clinical pharmacist to the paediatric critical care centre in which their study was carried out.[122] Relihan *et al.* appointed a medication safety officer during the study period; however, the responsibilities of this role were not detailed in the short report.[176]

Communities of Practice: Two of the included studies held regular forums with frontline staff at which ME reports were discussed.[122,165] Arabi *et al.* set up a weekly forum at which important feedback from incident reports was shared with frontline staff, and action plans were discussed and developed.[165] Costello *et al.* held monthly

interactive focus groups to discuss the previous month's incidents and to brainstorm methods to prevent future events.[122]

5.4.5 Outcomes

All studies reported an increase in the rate of reporting between the pre- and post-intervention periods, as displayed in **Table 5.2**. However, only one study compared a control group with an intervention group, therefore the effectiveness of the different intervention types could not be calculated. Evans *et al.* reported a significant improvement in reporting in the intervention group compared to the control group. In the control group, 54.5 incidents were reported per 10,000 observable bed days (OBDs) at baseline, compared to 101.0 reports/10,000 OBDs post-intervention. The intervention group saw an increase from 82.8 reports/10,000 OBDs at baseline to 189.6 reports/10,000 OBDs post-intervention.[180] Two studies that compared one group pre- and post-intervention also reported significant increases in reporting. Savage *et al.* reported that the average number of MEs reported each month increased by 88% after implementation of the Medmarx® system (60±88, $p<0.001$), and the Lifesavers programme implemented by Force *et al.* was associated with a significant increase in ME reporting, from a mean monthly rate of 14.2 reports in the 12 months before the programme to 72.5 in the 12 months after the programme ($p<0.001$).[167,177]

5.5 Discussion

To our knowledge, this is the first systematic review to examine the evidence on interventions to improve ME reporting in hospitals globally. Although this review found limited evidence to support the effectiveness of several interventions to improve ME reporting in hospitals, a variety of interventions were tested which, when considered alongside recent quantitative and qualitative research on ME reporting, may warrant further investigation.

The included studies that implemented a new reporting system were either paper-based or web-based systems, each of which carry advantages and disadvantages. Web-based systems avoid the shortcomings of paper-based systems, can be sent immediately to a hospital's risk management department, allow easy compilation and analysis of data, and can be accessed from any hospital computer or mobile web-interactive device.[173,181] Although they did not meet the inclusion criteria for this review, recent studies by George *et al.* and de Vries *et al.* investigated the use of mobile telephone applications for ME reporting and found that they had the potential to increase reporting.[182,183] However, computers are often in high demand in a resource-scarce hospital setting, and it may be difficult to find a computer in a private location to fill out an incident report. Paper-based reporting forms can be placed at convenient locations throughout the hospital and can be designed to fit in a pocket so they can be filled in at any time.[174,179] However, paper-based reporting forms are less practical in terms of collection and analysis, are less environmentally friendly, are less secure and could easily be lost or mislaid. Two of the identified

studies reduced the length of their reporting form to encourage reporting.[164,166] Reporting fatigue has been identified as a barrier to reporting in a number of studies.[110,149] Whether paper- or web-based, it is therefore important to design a succinct reporting form that will not put excess time pressure on busy HCPs.

Encouraging a non-punitive culture is an important factor in improving the reporting of MEs in hospitals. The fear of punitive action can be a significant deterrent to the reporting of MEs.[184–186] Rather than being considered an admission of fault, error reporting should be encouraged and seen as an opportunity to learn from mistakes and improve systems to ultimately improve patient safety.[3] As the identified studies have suggested, a non-punitive culture could be encouraged using a variety of intervention types including educational meetings, educational materials, audit and feedback, and communities of practice.

Maintaining anonymity is an important factor to consider when designing a reporting system.[151] An anonymous system implies a non-punitive reporting culture and may make hospital staff more likely to report errors.[185] However, as discussed by Force *et al.*, anonymous reporting can prevent valuable follow-up procedures being carried out after a medication incident.[167] There is also the option of requiring the person reporting the incident to give their name, but not the name of the staff involved in the incident, as was done by Haw *et al*., however this may discourage the reporting of incidents that are not witnessed by another member of staff.[171] Qualitative research has shown that fear and concerns related to taking responsibility for a ME

can inhibit reporting.[184,186] An anonymous reporting system could help to overcome these barriers.

Educational interventions can improve healthcare workers' knowledge of how to report incidents, promote a non-punitive environment and improve safety culture.[144,185,187] A lack of education about the reporting process has been identified as a barrier to reporting.[150] A mixture of formal educational sessions, such as lectures on patient safety, and informal educational meetings or materials, such as lunchtime educational sessions or an online tutorial on using a new reporting system, could be used to improve both error reporting and patient safety culture. This was demonstrated by Ramirez *et al*., who found a significant correlation between the number of staff attending patient safety training workshops and the rate of error reporting.[175]

Role expansion or task shifting could also be an effective strategy to improve patient safety culture and increase ME reporting. A significant amount of work is involved in collecting and analysing error reports and feeding this information back to frontline staff.[153] These responsibilities could be shared between a committee or taken on by a staff member with a dedicated safety role. Lack of support from management has been identified as a barrier to reporting.[150] Creating a safety committee or a safety-focused staff role demonstrates hospital management's commitment to patient safety, which could therefore have a positive impact on reporting rates.

This review has some limitations. When assessed with the EPHPP Quality Assessment tool for Quantitative Studies, none of the studies identified in the review were found to be of high methodological quality.[163] There was heterogeneity across the studies in terms of what was reported, how it was defined and how reporting rates were measured. As only one identified study tested an intervention group against a control group, it was not possible to determine the effectiveness of any of the interventions identified in this review. It was also not possible to determine whether any of the interventions used in the included studies are still in use. These factors to some extent limit the conclusions that can be drawn from this review.

5.5.1 Future Research

This review identified numerous interventions that have been implemented in healthcare organisations without clear evidence of their effectiveness. As many of the interventions highlighted in this review are resource-intensive and given the resource-constrained nature of most healthcare systems, it is imperative that future interventions are developed and assessed appropriately. The Medical Research Council guidance on developing and evaluating complex interventions stresses the importance of developing a theoretical understanding of the likely process of change by drawing on existing evidence and theory.[188]

In order to implement new practices or change existing practices in an organisation, it is necessary to understand individual and collective behaviours within that organisation, and the contextual factors that influence those behaviours.[189] The Theoretical Domains Framework (TDF) is an implementation research tool that was developed to identify influences on HCP behaviour to assist in the implementation of evidence-based recommendations, which can be utilised in conjunction with the Behaviour Change Wheel (BCW)(**Figure 5.2**), a tool designed to guide the selection of interventions or behaviour change techniques.[189,190] Once a behaviour of interest has been selected (for example, filling out a medication incident report), the TDF can be used to identify facilitators and barriers to the implementation of that behaviour, and these results can be mapped onto the BCW to determine which intervention functions or policy categories would be most effective at achieving the desired behaviour change.[190]

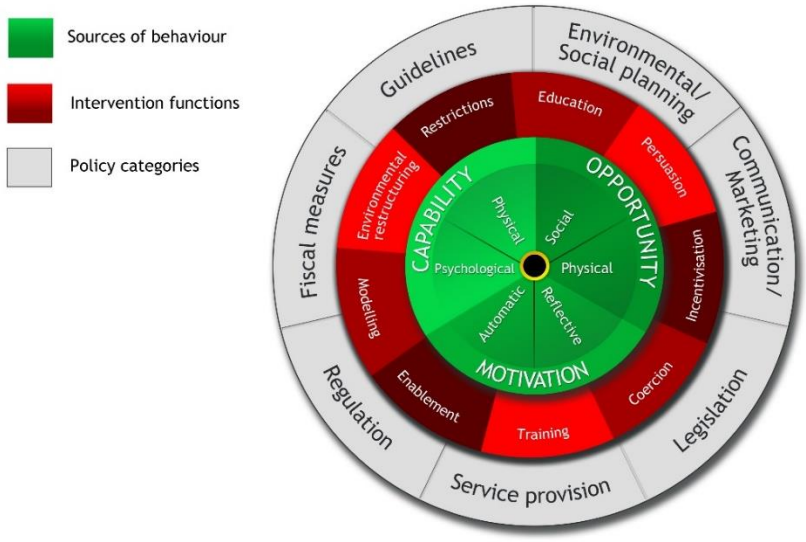

Figure 5.2: Behaviour Change Wheel [190]

Although the most common methods for collecting data using the TDF are semi-structured interviews or focus groups, TDF studies have also been conducted using surveys.[189,191] A potentially time- and cost-effective intervention study to improve ME reporting in an Irish healthcare organisation could utilise a TDF-based survey to determine staff attitudes towards medication incident reporting, and then subsequently map the survey results onto the BCW. A survey to assess HCPs' attitudes towards medication incident reporting has been included in **Appendix 9**.

5.6 Conclusion

The important role played by ME reporting in improving patient safety has been emphasised by several major organisations over the past two decades. Despite this, this review has identified a lack of studies demonstrating the effectiveness of interventions to improve ME reporting. Although efforts to promote safety culture and improve error reporting in healthcare are to be encouraged, it is crucial that future research in this area is carried out using appropriate methods to design interventions and assess intervention effectiveness.

Chapter 6 : Interprofessional Communication in the Hospital Setting: A Systematic Review of the Qualitative Literature

Publication:

The work presented in this chapter has been submitted for publication in *The Journal of Interprofessional Care*.

6.1 Abstract

6.1.1 Aim

Communication plays a key role in the provision of safe patient care, and miscommunication in healthcare can lead to avoidable patient harm or mortality. IPC can be challenging due to differences in training, education and roles between healthcare professions. The aim of this systematic review was to synthesise the qualitative evidence regarding healthcare providers' perceptions of IPC in the hospital setting.

6.1.2 Methods

Four databases (PubMed, CINAHL, Web of Science and Embase) were searched for studies that met the inclusion criteria. Eighteen studies were identified as suitable for inclusion in the review and were examined using thematic synthesis.

6.1.3 Results

Thematic synthesis led to the development of two primary analytical themes: (i) '*Barriers to IPC*' and (ii) *'Facilitators to IPC'*. Personal factors, such as strong interprofessional relationships, were found to be important facilitators to IPC, while organisational factors, such as challenging and hierarchical working environments, were found to pose barriers to IPC.

6.1.4 Conclusion

This systematic review revealed the importance of interpersonal factors in IPC. Future research and interventions to improve IPC should focus on modifiable personal factors, such as improving mutual respect and understanding between healthcare professions.

6.2 Introduction

The Joint Commission for the Accreditation of Healthcare Organisations, a US non-profit healthcare organisation, defines communication as '*the transfer of content from a sender to a receiver*', and effective communication as when '*both the sender and receiver achieve a shared understanding and perceive the content in the same way*'.[192] Communication is widely recognised to play a key role in safe patient care. The IOM report '*Crossing the Quality Chasm*', which was published in 2002, stated that '*effective methods of communication, both among caregivers and between caregivers and patients, are critical to providing high-quality care*'.[193] The WHO has recognised communication between healthcare providers as a key defensive layer in ensuring patient safety and preventing avoidable patient harm, while miscommunication in healthcare has been linked to poor patient outcomes including ME, misdiagnosis, patient injury and death.[27,72,194–196] From 1999 to 2004, the dominant root cause of events reported to the Joint Commission was a failure in communication.[192] A 2009 systematic review by Tully *et al.* on causes of prescribing errors identified poor communication as an error-provoking condition.[197] In a study by Graber *et al.* on factors contributing to diagnostic errors in internal medicine, communication failure was one of the most common system-related contributions to error.[198] A 2013 intervention study involving the SBAR communication tool found that its use resulted in improved perceptions of communication and a decrease in unexpected deaths in the hospital setting.[199,200]

While clinician-clinician and clinician-patient communication are of vital importance to patient safety, achieving effective communication between HCPs of different professions can pose a unique challenge due to interprofessional differences in training, education, language and roles.[195] Because of the unique and valuable input that each member of the MDT has on patient care, it is generally accepted that effective IPC is a key factor in maintaining patient safety.[201]

Due to the nature of IPC, the majority of research on this subject has been qualitative, exploring the views of HCPs on IPC.[195] Qualitative research can provide very valuable insights into a subject that may not be achievable with quantitative research methods.[202] To date, however, the qualitative evidence on IPC has not been synthesised in a systematic manner in the published literature. The aim of this study is therefore to synthesise the existing qualitative evidence on healthcare providers' experiences on IPC in the hospital setting.

6.3 Methods

A systematic review of the qualitative literature relating to healthcare providers' experiences of IPC in the hospital setting was undertaken. Details of the protocol for the review were registered with PROSPERO (registration number CRD42020177967).

6.3.1 Search Strategy

An electronic search was conducted from inception until May 2020 using the Pubmed, CINAHL, Web of Science and Embase (OVID) databases. A search strategy was devised based on three concepts: (i) IPC, (ii) hospital setting, and (iii) qualitative literature. MeSH were used where appropriate and the search strategy was modified between databases as necessary. In all four databases, the search was restricted to studies conducted in humans, in the English language, and published since the year 2000. The full search strategy is available in **Appendix 10.** The reference lists of selected studies were also searched for potentially eligible studies.

Studies were eligible for inclusion in the review if they met the following criteria:

- Studies examining HCPs' experiences of inter-professional communication,
- Hospital setting, and
- Using qualitative research methods.

Studies were excluded if they were:

- Studies in the community or primary care setting (or examining communication between these settings and the hospital setting),
- Studies examining intra-professional communication,
- Quantitative or intervention studies,
- Systematic reviews,
- Studies with students as participants,
- Studies investigating interprofessional teamwork or collaboration and
- Qualitative studies based solely on observational data.

6.3.2 Study Selection

In the first stage of the review, the primary researcher (LG) screened the search results from the four databases to identify potentially relevant titles. Abstracts were then screened, and the remaining full-texts were independently assessed by two reviewers (LG and GLO'B). Any disagreements were resolved through discussion. The reference lists of included studies were also searched to identify any potentially relevant studies. EndNote X8 was used to manage references at this stage of the review process.

6.3.3 Quality Appraisal

Quality appraisal of the identified studies was carried out by two researchers independently using the Critical Appraisal Skills Programme (CASP) tool for qualitative research.[203] Any disagreements between the researchers were resolved through discussion. This appraisal tool was used to moderate the findings of this

review in terms of the rigour and the quality of findings; however due to ongoing debate, it was not used to determine study inclusion or exclusion.[204]

6.3.4 Data Extraction and Analysis

Data were extracted from the included studies using a dedicated data extraction form with the following headings: author and year, country, participants, data collection method, data analysis method and aim. Data from the results sections of the included studies were then synthesised using thematic synthesis as described by Thomas and Harden.[204] This method allows the researcher to synthesise the data in a transparent way, while generating new concepts and ideas that go beyond the original findings of the studies. Thematic synthesis consists of three stages, which are described in **Table 6.1**.

Table 6.1: Thematic Synthesis Stages

Thematic Synthesis Stage	**Description**
Coding	Line-by-line coding was applied to all text relevant labelled '*results'* or '*findings'* in the included studies.
Descriptive Themes	Codes were organised into categories which were then developed into descriptive themes that reflected the results of the included studies.
Analytical Themes	Descriptive themes were developed into analytical themes that addressed the review question.[204]

QSR International's NVIVO® Version 12 was used during thematic synthesis.[114] The above steps were carried out by two reviewers (LG and GLO'B), with any disagreements that could not be resolved through discussion being referred to a third reviewer when necessary. This systematic review is reported in accordance with the Enhanced Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) guidelines (**Appendix 11**).[205]

6.4 Results

6.4.1 Study Selection

The initial database search identified 7,493 studies, of which 2,222 duplicates were removed. The remaining 5,271 titles were screened, and 5,129 studies were excluded based on their title. The abstracts of the remaining 142 studies were screened, 54 of which met the criteria for full text screening. At the full text screening stage, 36 studies were excluded, resulting in 18 studies being eligible for inclusion in this review. No additional studies were identified through reference list searching. **Figure 6.1** shows the PRISMA diagram for the study selection process.

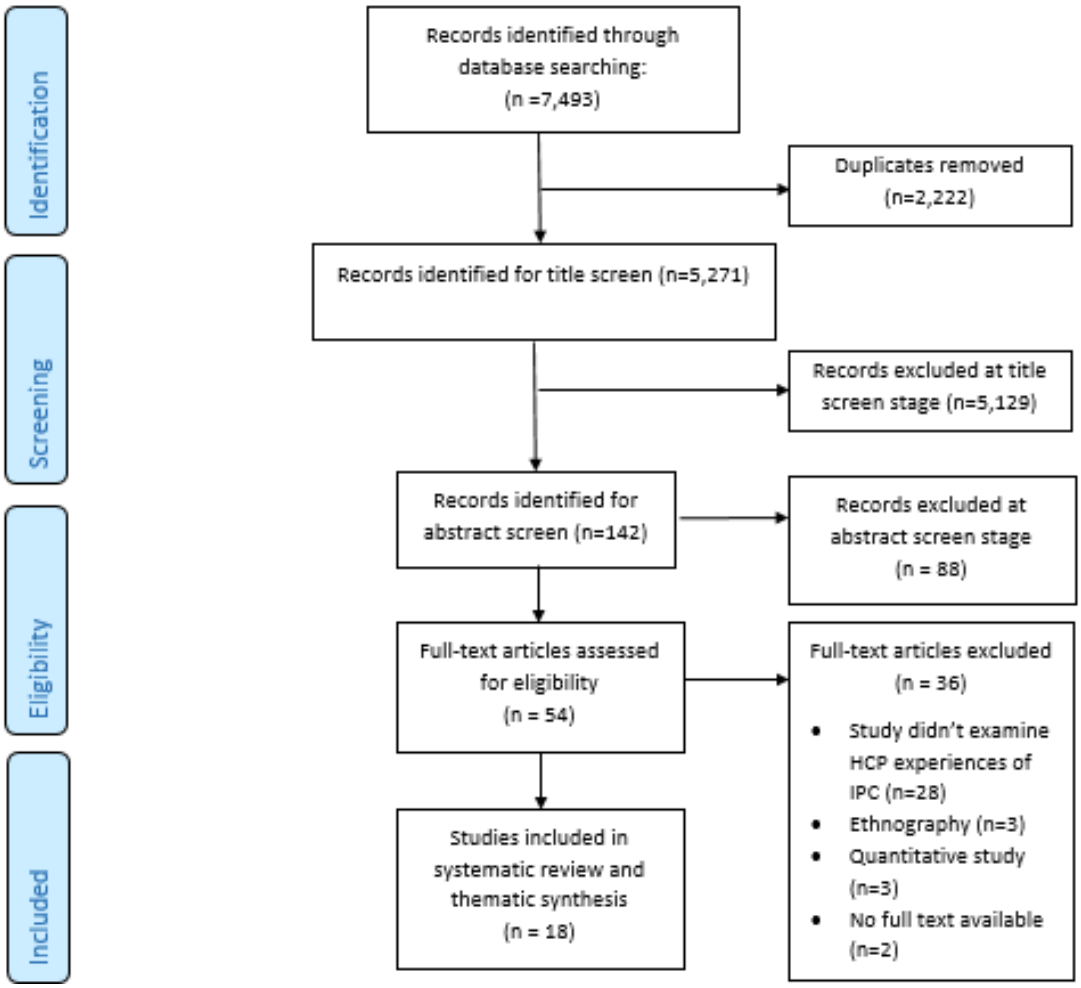

Figure 6.1: PRISMA Flow Diagram

6.4.2 Characteristics of Included Studies

The included studies were carried out in hospitals in Australia,[206] Canada,[207–210] England,[211–213] Iran,[214,215] Ireland,[216] Korea,[217] and the US.[218–223] Study participants included doctors,[206,208,218–223,209–212,214–217] nurses,[206,207,219–221,223,208–210,212,213,215,216,218] surgeons,[208,210,212] pharmacists,[206,209,218,219] other allied HCPs,[206,209] and non-clinical healthcare staff.[208,209,218] Data collection methods included interviews,[206,208,221,209–212,214–217] focus groups,[207,213,216,218,220–223] a mixed-methods survey,[219] and observations and shadowing,[208,220,221] however results from observations and shadowing were not included in the thematic synthesis. Methods of qualitative data analysis used in the included studies were thematic analysis,[207,209,211,216] content analysis,[214,215,219,221,222] framework analysis,[218] emergent theme analysis,[212] Colaizzi's descriptive phenomenology,[217] inductive data analysis,[210] and thematic grounded theory.[206] One study did not specify their method of data analysis.[208] While specific study aims varied, all studies used qualitative methods to explore IPC. **Table 6.2** summarises the characteristics of the included studies.

Table 6.2: Characteristics of Included Studies

Author (Year)	Country	Participants in Interviews or Focus Groups (n)	Data Collection Method	Qualitative Data Analysis	Aim
Axon *et al.* (2018)[211]	England	Doctors (27)	Semi-structured interviews	Thematic Analysis	To explore factors affecting communication between Foundation Year 1 (FY1) doctors and hospital pharmacists about prescribing issues from the FY1 doctors' perspective.
Brady *et al.* (2017)[216]	Ireland	Doctors and nurses*	Focus groups (junior Non-Consultant Hospital Doctors (NCHDs)) and staff nurses) and interviews (nurse managers and senior NCHDs)	Thematic Analysis	To evaluate the nature and type of communication and workflow arrangements between nurses and doctors out of hours.
Butler *et al.* (2019)[207]	Canada	Nurses (57)	Focus groups	Inductive Thematic Analysis	To explore acute care staff nurses' perspectives on IPC in care prioritizing older people's functioning.
Esmaeilpour-Bandboni *et al.* (2017)[214]	Iran	Doctors (4)	Interviews	Content analysis	To explore the perspectives and experiences of physicians on nurse–physician professional communication.
Fernando *et al.* (2016)[208]	Canada	Nurses (31), surgeons (18) and one case manager	Observation and interviews (22 nurses and 10 surgical trainees)	Not specified	To explore barriers and enablers to nurse-trainee communication.

Author (Year)	Country	Participants in Interviews or Focus Groups (n)	Data Collection Method	Qualitative Data Analysis	Aim
Gotlilb Conn *et al.* (2012)[209]	Canada	Doctors (5), pharmacists (5), unit managers (6), nurses (6), program executives (4), social workers (2), one dietitian, one physiotherapist, occupational therapist	Semi-structured interviews	Inductive Thematic Analysis	To explore how health care providers in general internal medicine experience communication with one another in a hospitalist versus consultant structured setting.
Grobman *et al.* (2011)[218]	US	Nurses (6), doctors (8), pharmacy staff (3), unit secretary (1)	Focus groups	Framework analysis	To examine the nature of communication behaviours among care providers in a labour and delivery unit, and to explore clinicians' perceptions of communication barriers.
Haas *et al.* (2015)[210]	Canada	Surgeons (11), doctors (9), nurses (5)	Semi-structured interviews	Inductive data analysis	To characterize communication between intensivists and surgeons and to assess enablers and barriers of effective communication.

Author (Year)	Country	Participants in Interviews or Focus Groups (n)	Data Collection Method	Qualitative Data Analysis	Aim
Hirschfield *et al.* (2019)[219]	US	Interdisciplinary HCPs (408)	Mixed-methods survey with open-ended questions	Content analysis	To identify how inpatient team communication practices match the needs of teams caring for these patients and families, and to identify priority areas for improvement.
Jafari Varjoshani *et al.* (2014)[215]	Iran	Nurses (15), doctors (5), technicians (4), nursing assistant (1)	Interviews	Content analysis	To explain barriers to inter-professional communication in an emergency department.
Manojlovich *et al.* (2015)[220]	US	Nurses (4) and doctors (9)	Observation, shadowing and focus groups	Descriptive analysis	To develop a methodology for identifying and characterizing communication events between physicians and nurses to better understand communication patterns on general medical–surgical units.
Manojlovich *et al.* (2020)[221]	US	Nurses (91) and doctors (32)	Interviews, focus groups, shadowing and observation	Directed content analysis	To develop a more detailed understanding of communication practices between nurses and physicians on general care units.
Nagpal *et al.* (2012)[212]	England	Surgeons (7), doctors (5) and nurses (6)	Semi-structured interviews	Emergent theme analysis	To explore the communication and information transfer failures across the entire surgical care pathway.

Author (Year)	Country	Participants in Interviews or Focus Groups (n)	Data Collection Method	Qualitative Data Analysis	Aim
Nestel *et al.* (2006)[213]	England	Nurses (7)	Focus group	Thematic Analysis	To report nurses' perceptions and experiences of communication in the operating theatre.
Olde Benkikk *et al.* (2018)[222]	US	Doctors (14)	Focus groups	Inductive content analysis	To explore emergency medicines residents' perceptions and behaviours related to IPC.
Park *et al.* (2018)[217]	Korea	Doctors (10)	Interviews	Colaizzi's descriptive phenomenology	To understand the experience of communication concerning patient safety between physicians and nurses in hospitals.
Robinson *et al.* (2010)[223]	US	Doctors (9) and nurses (9)	Focus groups	Thematic Analysis	To explore nurse and physician perceptions of effective and ineffective communication between the two professions.
Rowlands *et al.* (2013)[206]	Australia	Doctors (8), nurses (9) and allied health professionals (5)	Semi-structured interviews	Thematic grounded theory	To explore how patient information is communicated between health professionals within a multidisciplinary hospital-based lung cancer team and to identify mechanisms to improve these communications.

**= 27 total participants*

6.4.3 Quality Appraisal

The results of the quality appraisal of the included studies are presented in **Table 6.3**. All studies provided a clear statement of their aims, and the use of a qualitative methodology was appropriate to achieve the stated aims of each study.[203] All studies used appropriate recruitment strategies and data collection methods, took ethical issues into consideration and provided a clear statement of study findings.[203] The results of all studies were considered valuable.[203] One study did not clearly describe the research design used.[222] Nine studies did not adequately consider or describe the relationship between the researchers and the study participants.[206–210,213,215,218,219] One study did not provide a clear description of the data analysis process, therefore the rigor of data analysis could not be determined.[213]

Table 6.3: Quality Appraisal

Author (Year)	Clear statement of aims?	Is qualitative methodology appropriate?	Was research design approriate?	Was recruitment strategy appropriate?	Was data collection method appropriate?	Has the reflexivity been adequately considered?	Have ethical issues been taken into consideration?	Was data analysis rigourous?	Clear statement of findings?	Is the research valuable?
Axon *et al.* (2018)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Brady *et al.* (2017)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Butler *et al.* (2019)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Esmaeilpour-Bandboni *et al.* (2017)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fernando *et al.* (2016)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Gotlilb *et al.* (2012)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Grobman *et al.* (2011)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Haas *et al.* (2015)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y

Author (Year)	Clear statement of aims?	Is qualitative methodology appropriate?	Was research design approriate?	Was recruitment strategy appropriate?	Was data collection method appropriate?	Has the reflexivity been adequately considered?	Have ethical issues been taken into consideration?	Was data analysis rigourous?	Clear statement of findings?	Is the research valuable?
Hirschfield *et al.* (2019)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Jafari Varjoshani *et al.* (2014)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Manojlovich *et al.* (2015)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Manojlovich *et al.* (2020)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nagpal *et al.* (2012)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nestel *et al.* (2006)	Y	Y	Y	Y	Y	N	Y	N	Y	Y
Olde Benkikk *et al.* (2018)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Park *et al.* (2018)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Robinson *et al.* (2010)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Author (Year)	Clear statement of aims?	Is qualitative methodology appropriate?	Was research design approriate?	Was recruitment strategy appropriate?	Was data collection method appropriate?	Has the reflexivity been adequately considered?	Have ethical issues been taken into consideration?	Was data analysis rigourous?	Clear statement of findings?	Is the research valuable?
Rowlands *et al.* (2013)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y

6.4.4 Analytical Themes

Two analytical themes were developed during thematic synthesis: '*Barriers to IPC*' and *'Facilitators to IPC*'. These themes were developed from five descriptive themes:

1) *'Hierarchy'*,

2) '*Interprofessional Ethos'*,

3) *'Healthcare Environment'*,

4) '*Personal Factors'* and

5) '*Methods of Communication'*.

As displayed in **Figure 6.2**, all five descriptive themes contributed to both analytical themes to varying degrees.

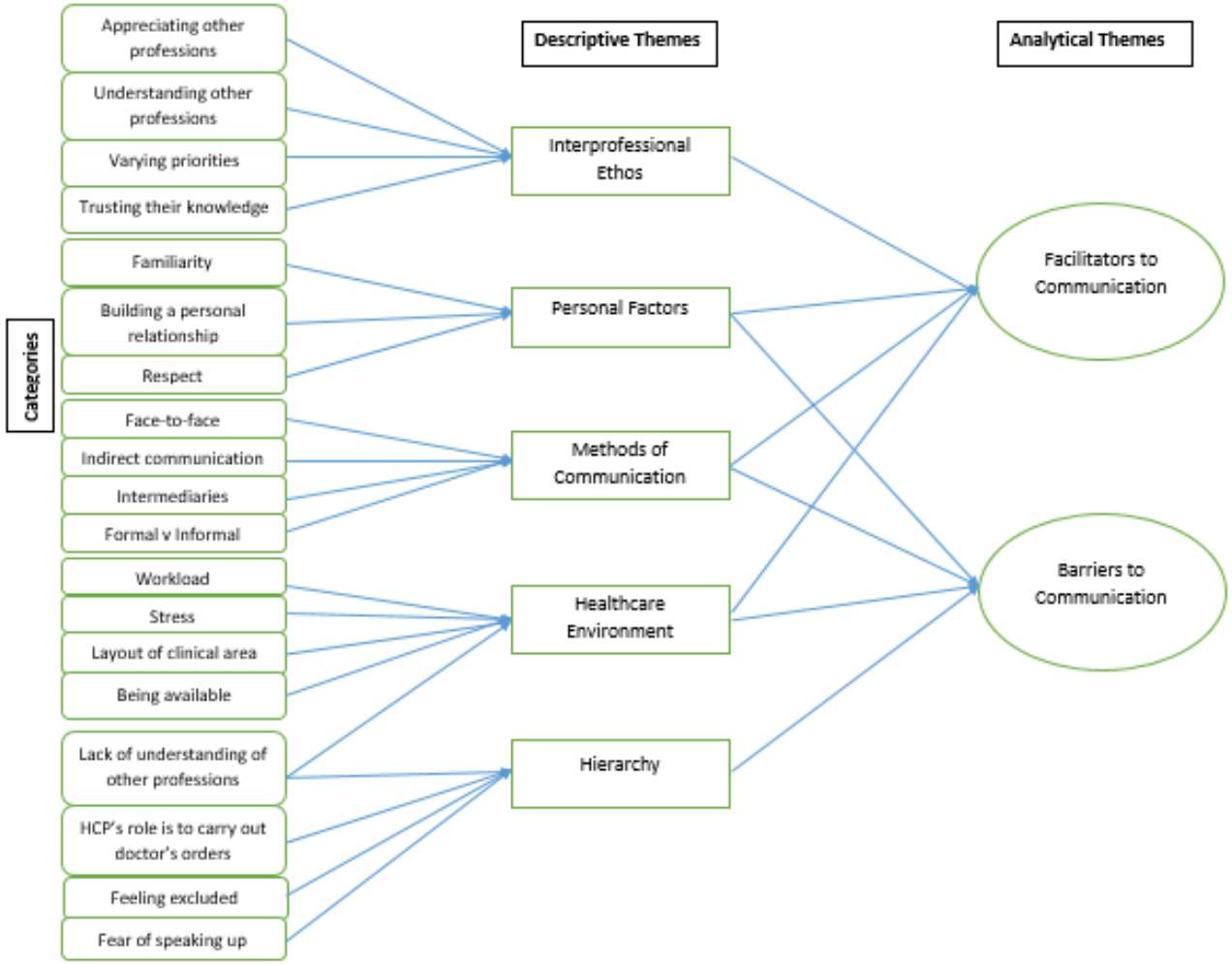

Figure 6.2: Development of Analytical Themes

Facilitators to Communication: Across the included studies, having a mutually positive and respectful relationship between colleagues was recognised as a fundamental factor in improving IPC. Understanding the role of other professions and valuing their particular contributions were considered to be beneficial to IPC, as described by Robinson *et al*.: '*An authentic understanding of what each professional uniquely provides in terms of patient care was seen as an important factor in effective communication*'.[223] In order to have effective communication with another HCP, it was necessary to comprehend the particular skills and role in patient care of that colleague. Similarly, Olde Bekkink *et al*. found that trusting in the knowledge and skills possessed by a member of another profession to be a facilitator to IPC: '*Team building is further impeded by unfamiliarity both on a content level (unawareness of the other professionals' skillset and expertise) and a relationship level*'.[222]

Having a good personal relationship was also believed to be beneficial to IPC, as discussed by Haas *et al*.[210] They commented that '*Participants overwhelmingly preferred communication with individuals with whom they were familiar based on pre-existing, personal relationships*'. Study participants regularly mentioned how important it was to build a personal relationship with their colleagues to ensure that they could communicate and work together effectively. Physicians interviewed by Axon *et al.* commented that '*….knowing the names of pharmacists aided communication by getting to know the pharmacists better and establishing rapport within the MDT*'.[211] Other personal factors such as being approachable, respectful and level-headed during stressful situations were considered to be beneficial to IPC.

Participants in the study by Grobman *et al*. described the importance of mutual respect, commenting that '…. *participants expressed the view that disrespectful behaviour not only impaired good communication at the time it was experienced, but that it created an environment in which individuals were less likely to express their opinions about clinical concerns'.*[218]

Certain communication methods were seen as facilitators to IPC. Study participants universally believed that direct, face-to-face communication was more effective than indirect communication, as described by Butler *et al*.: '*Participants concurred that they favoured synchronous, face-to-face communication with other professionals because it allowed for nuanced understanding of context and instantaneous elaboration and clarification*'.[207] However, certain types of indirect communication, including the use of patient notes, telephones and pagers, were thought to aid IPC. Esmaeilpour-Bandboni *et al*. reported that '….*the preferred style of nurse–physician professional communication was the formal method of written communication in the patient's record. This ensured the physicians that nurses would implement their orders precisely for patient care*'.[214] Study participants also distinguished between formal communication methods, such as clinical rounds, and informal communication such as having an unscheduled conversation in a corridor. Butler *et al*. found that communication preferences differed between professions, stating that '*Nurses in medical–surgical units and [critical care units], in contrast, indicated that their working arrangements involved less frequent informal interactions amongst IP colleagues and placed a higher premium on less interruptive, strong structured modes*

of IP communication'.[207] Both methods had advantages and disadvantages. While nurses preferred more formal, structured communication, doctors seemed to prefer informal communication, commenting that '*Dialogues at the bedside and quick chats in the corridors or at the nurses' station were preferred*'.[207]

Barriers to Communication: The presence of a hierarchal environment, where some professions felt it was not their place to speak up to other professions, was almost universally recognised as a major barrier to IPC. There was often a sense that doctors were considered, or considered themselves to be, more senior than nurses, or that the role of the nurse was simply to carry out doctors' orders. For example, Esmaeilpour-Bandboni *et al*. reported that '….*physicians expected the nurse to become familiar with each physician's work routines, and follow their orders and routines without questioning*'.[214] Manojlovich *et al*. reported that this sense of hierarchy could lead to nurses feeling excluded from decision-making clinical rounds: '*Through the nurse focus group, we learned that nurses often felt intimidated by the large groups of physicians that would come to the unit to make daily patient care rounds, and were therefore reluctant to interact with the entire medical team during rounds*'.[220]

There was a similar sense of hierarchy between doctors and other professions. Some HCPs felt a reluctance to approach or to speak up for themselves in the presence of doctors. Nestel *et al.* reported that '*Standard patterns of communication based on role were further reinforced… by the influence of medical dominance in*

communications between team members. This influence was particularly seen at the MDT meeting where most communication occurred between doctors'.[213] In the interviews they carried out, Nagpal *et al*. stated: '*A need for cultural and system changes also emerged… that is, a culture of openness and transparency where everybody can raise their concern and is not afraid of the seniors*'.[212] This issue was compounded by what was sometimes perceived as a lack of respect among senior doctors towards nurses and other professions. As stated by a nurse interviewed by Gotlib Conn *et al*.: '*In the last 10 years, the younger doctors have become more respectful and I think that it comes from their training. There are no longer old school ideas where the nurses are treated like the doctors' maid*'.[209]

While valuing the role of another HCP was a considered a facilitator to IPC, insufficient understanding of a colleague's role was seen as a barrier to communication. A physician interviewed by Park *et al*. stated: *'I do not know what kind of education nurses have received and what exactly they do here. I think that many physicians would not know either. I think nurses look at us in the same way. They might think "Physicians just come over for a short period, give orders and submit progress records." In that sense, I think we basically have no understanding of each other. So, it is difficult for nurses and doctors to form cooperative relationships in patient care*'.[217] Some study participants admitted to not understanding the responsibilities of certain professions regarding a patient, or not knowing who was in charge of a certain patient, which led to difficulty identifying who they needed to communicate with. This was more often the case for professionals who were

perceived to be at the top of the hierarchy, as reported by Manojlovich *et al*.: '*In the physician focus group, physicians voiced their frustration with not knowing which nurse was providing care for a specific patient*'.[220] It was also recognised that priorities varied between healthcare professions and healthcare settings, and not understanding a colleague's priorities was a barrier to effective communication, as described by Haas *et al*., '*Communication was perceived as "bad" when.. the two teams were perceived to be working toward different goals*'.[210]

The healthcare environment was also believed to have an important impact on the quality of IPC, especially when that environment was negative or stressful. A heavy workload reduced the amount of time that a HCP could spend engaging in IPC, increasing the risk of miscommunication. A physician who participated in the study by Esmaeilpour-Bandboni *et al*. stated that '*The work overload and patient crowding hinder me to have an in-depth face-to-face and full-time communication with nurses*'.[214] Stressful situations, while putting time pressure on communication, made HCPs more likely to be unfriendly or disrespectful towards their colleagues, as described by Jafari Varjoshani *et al*.: '*It seemed evident according to the participants that stressful environment acted as a barrier to establishment of appropriate inter-professional communication'*.[215]

The layout of the clinical area was another aspect of the healthcare environment that had an impact on IPC. Often, consultant physicians were not based on the wards, but in an office at another location, which reduced the opportunities for other staff to

communicate with them. Jafari Varjoshani *et al*. reported that '*Since doctors were not continually present, and alternately did their rounds, they were not closely involved in clinical duties of nurses or their care procedures, which led to ineffective communication and stress for personnel*'.[215] In contrast, a pharmacist interviewed by Rowlands *et* al. described how '…. *the physical layout of the oncology unit with team members working in close proximity with one another within the outpatient clinic and chemotherapy unit was conducive to face-to-face communication: "I absolutely prefer face-to-face communication. The environment invites that" (Pharmacist)'*.[206] The quality of IT services, staff turnover, and the level to which hospital management supported IPC, were also identified as important factors. Hirschfeld *et al*. described how a lack of support from hospital administration could impact on IPC, as follows: '*HCPs perceived that the extra time needed for team communication and collaboration is costly and not valued by hospital administration*'.[219]

Being able to build a strong personal relationship with a member of another healthcare profession was considered to be a facilitator to IPC. In contrast, Haas *et al*. found that when a certain group of HCPs, such as intern doctors, regularly moved between clinical areas, this became a barrier to communication, as it prevented them from building strong working relationships with other staff: '*Participants identified the high turnover of trainees and the lack of familiarity with certain colleagues as major barriers to good communication*'.[210] Fernando *et al*. described how this issue especially affected nurses, as they spent considerable time interacting with intern doctors, and felt they needed more time with interns to learn to communication

better with them, '*Trainees' rotations would typically last anywhere from two to six months. Collegial relationships had to be rebuilt with each rotation, and the nurse educator at Centre A added, with reference to nurses, that: "…. we're starting from scratch because they're a new group" (Nurse #13, Centre A—interview)*'.[208]

Some communication methods were seen as barriers to effective IPC. Participants in the study by Jafari Varjoshani *et al*. felt that the use of indirect communication channels could lead to loss of information or delays in patient care: '*A sub-theme of ambience turmoil was inefficient communication channels, which included deficiency in written and electronic communication. Inefficient written communication was frequently cited by participants. Doctors' illegible handwriting caused lack of understanding doctor's orders, waste of time for nurses, and stress'*.[215] Haas *et al*. reported that the presence of intermediaries in IPC, such as a liaison nurse, was not considered to be as effective as direct, face-to-face communication: *'Either the bedside nurse or post-call ICU fellow were expected to act as an intermediary between surgical teams and the daytime ICU team; participants felt this practice led to information loss and did not permit collaborative interactions*'.[210]

6.5 Discussion

This systematic review synthesised the qualitative evidence on healthcare providers' experiences of IPC in the hospital setting. Synthesising evidence from the qualitative literature has provided a unique insight into the attitudes of healthcare providers towards IPC. Thematic synthesis of 18 studies revealed two analytical themes: '*Facilitators to IPC*' and '*Barriers to IPC*'. Maintaining an interprofessional ethos and building positive working relationships were identified as potential facilitators to IPC, while hierarchy and challenging working conditions were considered potential barriers.

A strong interprofessional ethos is a key component of effective IPC. Two recent systematic reviews reported the benefits that multidisciplinary collaboration can have on patient care.[224,225] Each member of the MDT has a unique set of knowledge, skills and experience, and can therefore make valuable individual contributions to patient care.[226] However, differences in training and communication styles can sometimes act as barriers to effective interprofessional collaboration.[227] Social identity theory explains how professional identity can impact IPC, as people tend to view members of their own profession more positively than other professions.[228] Many of the studies included in this review found that a lack of understanding about the role of another profession can present a barrier to IPC, while understanding and valuing the role of another profession can facilitate IPC. In recent years, there has been an increased focus on interprofessional education.[195] A greater emphasis on interprofessional practice in healthcare education, both undergraduate and as part

of continuing postgraduate professional education and development, may improve understanding between professions and further facilitate IPC.

Across the identified studies, developing strong working relationships with colleagues from other professions was widely considered to be another important facilitator of IPC. In any workplace, having mutual respect and experience of a colleague's working practices and communication style is considered essential to effective communication.[227,229] Unfortunately, the busy healthcare environment can make it difficult to form strong interprofessional relationships.[201] While participants in one of the identified studies mentioned informal rest breaks designed to help different HCPs to get to know each other, other studies acknowledged that high rates of staff turnover, especially with interns, made it difficult to develop relationships.[209,221] Similarly, the tendency of some healthcare providers to work in so-called 'professional silos' could have a negative impact on their ability to form positive working relationships.[229] Improving opportunities for socialising and the development of professional relationships between professions could have a positive effect on IPC.

Across the included studies, hierarchy was universally considered to act as a barrier to IPC. Hierarchy is well recognised in the literature as being detrimental to both open communication and patient safety, as it can discourage junior members of staff from speaking up on important matters to their senior colleagues.[3,195,229] Organisational structures with fewer levels of management between staff and executive

management can encourage open communication, although attitudes towards communication vary depending on a HCP's position in the professional hierarchy.[229,230] In a study by Sexton *et al.* into attitudes towards teamwork in medicine and aviation, 80% of staff in an ICU that encouraged flatter hierarchies agreed that it was easier for them to speak up or ask questions when they did not understand something. However, the same study found that senior staff were more supportive of steep hierarchies than their junior colleagues, indicating that hierarchy is a deeply ingrained social and cultural phenomenon.[46]

Challenging working conditions are known to have a negative impact on communication.[195,229] A number of the studies included in this review acknowledged the effect that stress can have on the quality of IPC.[212,215] The impact of stress on performance has been widely recognised, and the ability to effectively manage stress and fatigue among healthcare staff is a key factor in communicating effectively and maintaining patient safety.[3,46] Organisational factors such as the layout of a clinical area can also affect communication, introducing a physical barrier to communication while also increasing the likelihood of healthcare providers working in professional silos.[229]

The findings of this review suggest that personal factors are important facilitators to IPC, while organisational factors, such as challenging and hierarchical working environments, pose barriers to IPC. Rather than focusing on practical aspects of IPC such as structured communication tools or interprofessional meetings, the HCPs in

the identified studies considered personal factors, such as feeling comfortable speaking up about patient safety amongst more senior colleagues, to have the greatest impact on IPC. While study participants did occasionally discuss communication channels, HCPs placed far more emphasis on feeling listened to and understood by colleagues from different professions. Similar findings have been reported in the literature. An integrative review by Foronda *et al.* found that miscommunication can occur between physicians and nurses due to the fact that the two professions receive different training, and therefore develop different communication styles, which can lead to frustrations for both professions.[195] Thomas *et al.* also found that, while doctors considered their communication with nurses to be positive, nurses had more negative perceptions of their communication with doctors, citing difficulty speaking up and feeling that their input was not well received.[230]

Previous work on IPC has involved the development of tools to facilitate structured communication and aid information transfer.[192,199,200] However, tools such as SBAR tend to be focussed on the best way to provide physicians with information as quickly as possible, thus reinforcing the concept of a hierarchical healthcare environment.[199,200] The efficacy of other interventions such as daily team huddles can also be diminished by a sense of hierarchy.[231] The findings of this review suggest that healthcare providers perceive mutual interprofessional respect and understanding to have an important impact on IPC, perhaps more so than the way in which communication is structured or delivered.

This review has a number of limitations. The included studies are of varying quality. As with any qualitative research method, thematic synthesis involves a degree of subjectivity and may therefore be susceptible to bias. Also, most of the studies included in this review were carried out in developed countries, so the results reported here may not be applicable to hospitals in developing countries. However, the themes identified in the synthesis were consistent across studies from different countries, suggesting that this is a universal issue and that the findings of this review can be applied to a variety of settings.

6.5.1 Future Research

A key finding of this study is the importance that HCPs attribute to personal aspects of IPC, such the ability to speak up among more senior colleagues, which contrasts with some interventions that have been designed to improve IPC to date.[199,200] While the risks that miscommunication pose to patient safety are potentially highly significant, the findings of the present review suggest that future research on IPC should focus on improving interprofessional engagement and '*speaking up'* culture in healthcare organisations.

The term '*speaking up'* has been defined as "*persistent statement by HCPs of their concerns about safety through immediate questions and/or statements of opinion or information until a clear resolution is presented and doing so when it may involve*

mistakes or omissions made by staff in positions of seniority" and plays a significant role in maintaining patient safety.[232] As described in **Section 5.5.1**, the use of the TDF and BCW is a potentially resource-efficient method of designing an intervention to change behaviour in healthcare organisations. Based on the results of this systematic review, a survey was developed to assess HCPs' attitudes towards '*speaking up'* in their clinical area. The survey is based on the 14 domains on the TDF and, in conjunction with the BCW, its results could be applied in the design of an intervention to improve '*speaking up'* in healthcare (**Appendix 12**).

6.6 Conclusion

This review has synthesised the qualitative evidence on HCPs' perceptions of IPC in hospitals. Two analytical themes were developed; '*Facilitators to IPC*' and '*Barriers to IPC*'. The HCPs that participated in the identified studies felt that personal factors, such as strong professional relationships and a positive interprofessional ethos, were facilitators to IPC, while environmental and organisational factors, such as working conditions and hierarchy, were barriers to IPC. Future research should involve the theory- and evidence-driven design of interventions to improve factors of IPC, such as improving *'speaking up'* culture and interprofessional engagement.

Chapter 7 : Discussion

7.1 Chapter Description

The overall aim of this thesis was to investigate patient safety culture in different Irish healthcare organisations in particular and to explore potential methods to improve patient safety in Irish healthcare in general. In this chapter, the thesis will be discussed as a complete body of work, and an interpretation of the overall findings will be presented. The chapter will begin with a summary of the findings of each chapter of the thesis, followed by an integration of these findings to provide greater insight and understanding. The research presented here will be considered in relation to the published literature, and the strengths and limitations of the research will be discussed. Finally, recommendations for future research in this area will be presented. For reference, the thesis overview diagram has been reproduced in **Figure 7.1**.

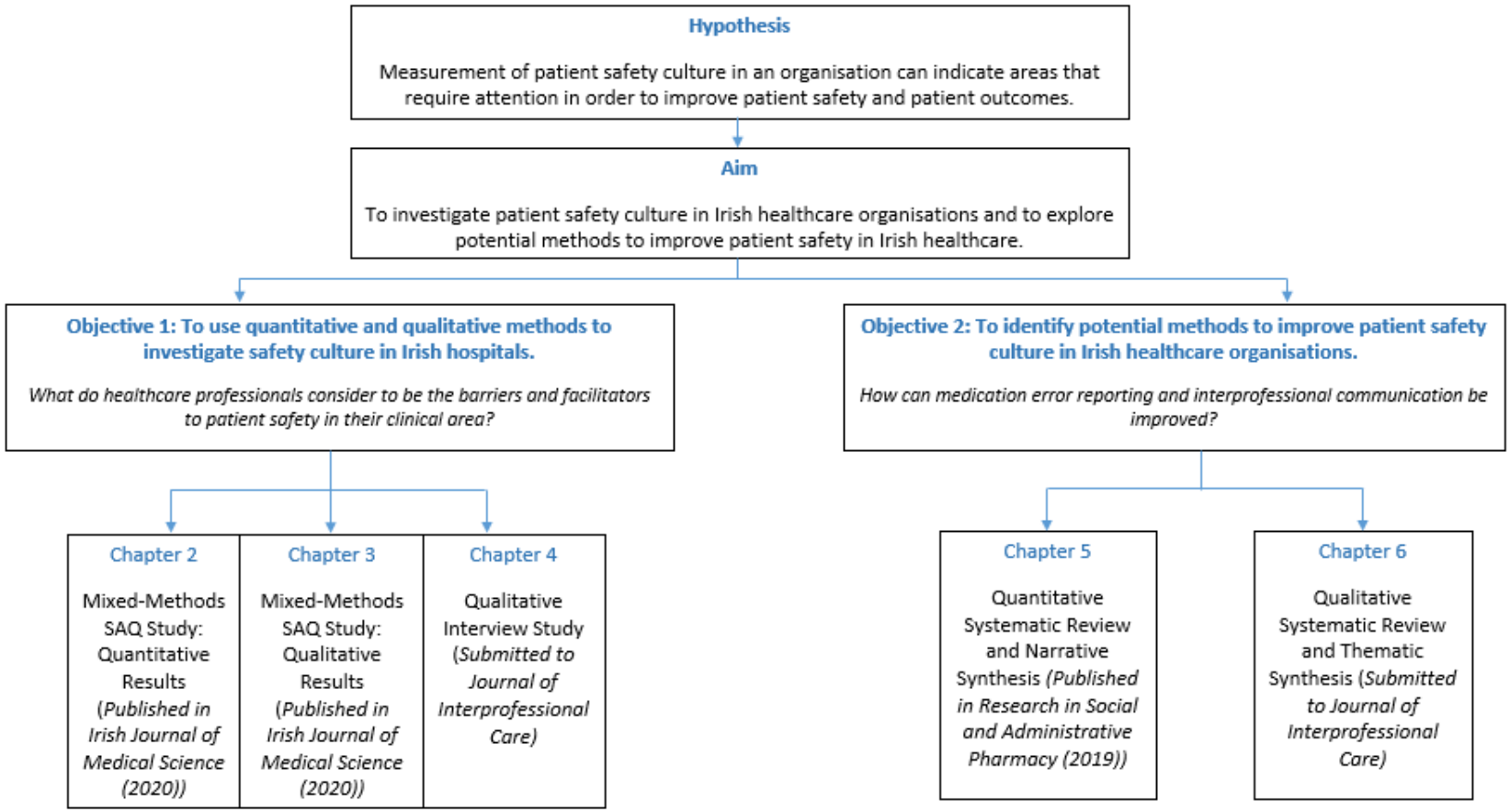

Figure 7.1: Thesis Overview

7.2 Summary of Findings

The first objective of this thesis was to investigate the safety culture in Irish healthcare organisations using the SAQ. **Chapter 2** presented the quantitative results of a multi-site study conducted in six healthcare settings across the south-west of Ireland. The healthcare organisations scored above the international benchmark in the majority of safety culture domains, however they tended to score poorly in the domains '*Working Conditions*' and '*Perceptions of Management'.* While analysing domain scores provided an opportunity to identify differences in attitudes between professions and settings, it was the examination of overall responses to individual survey statements that presented the most interesting depiction of the current state of Irish healthcare. More than 50% of survey respondents disagreed with the following statement: "*The levels of staffing in this clinical area are sufficient to handle the number of patients*", while less than half of survey respondents agreed with the statement "*Hospital management supports my daily efforts"*. A key finding of **Chapter 2** was that, despite generally positive attitudes towards patient safety, there appeared to be significant levels of discontent among HCPs regarding how Irish healthcare organisations are managed.

This finding was developed further in **Chapter 3**, which presents the qualitative results of the mixed-methods SAQ study. TA of the comments submitted by study participants in response to the question, "*What are your top 3 recommendations to improve patient safety in your clinical area?*", provided valuable insights into the experiences of Irish HCPs. '*Staffing Levels*' and '*Working Conditions*' emerged as

major themes, with comments referencing inadequate staff numbers, high levels of staff turnover, difficulty engaging with management and poor infrastructure. Due to the nature of the question, the comments could be expected to be negative, however TA also revealed a group of HCPs who were passionate about patient safety and patient care. The emergence of four other major themes, namely '*Patient Care'*, '*Communication*', '*Incident Reporting*' and '*Training and Education'*, elucidated HCPs' awareness of important patient safety issues and desire to provide the safest possible care to their patients. A key finding of **Chapter 3** was that Irish HCPs are dedicated and enthusiastic about providing safe and effective patient care, but struggle to do so in the context of an overstretched and under-resourced healthcare system.

Chapter 4 also addresses the objective of investigating the safety culture in Irish healthcare in which the results of a qualitative interview study with HCPs in a large teaching hospital are presented. In semi-structured interviews, physicians, nurses and HSCPs were asked about their perceptions of safety culture and patient safety in their clinical area. Similar to the findings of **Chapter 3**, the interviews illustrated some of the difficulties that HCPs face when trying to provide safe care in a resource-scarce environment. Two major themes emerged from TA of the interviews: 1) the hospital as a place of care provision, and 2) the hospital as a place of work. As a place of care provision, the hospital was made up of many hard-working teams who functioned well together and were enthusiastic about patient safety and quality improvement initiatives. However, the hospital environment could negatively impact both patient

safety and staff wellbeing. Study participants recognised the importance of incident reporting and acknowledged that the reporting system in the hospital could be improved, and that breakdowns in communication between HCPs are a common cause of patient safety incidents.

The second objective of this thesis was to identify methods to improve patient safety culture in Irish healthcare organisations. The quantitative systematic review presented in **Chapter 5** was carried out because the importance of incident reporting in the provision of safe patient care and the need for a better reporting system were common emerging themes across **Chapters 2**, **3** and **4**. The review identified 17 studies of interventions designed to improve medication incident reporting in hospitals. The most common intervention types were critical incident reporting, i.e., introducing a new incident reporting system, and audit with feedback, i.e. reviewing incident reports and providing feedback to staff. Although all identified studies reported an increase in incident reporting post-intervention, no studies were found to be of strong methodological quality. For this reason, a narrative synthesis was conducted to investigate which factors should be considered when designing an intervention to improve incident reporting. The format of the reporting system, anonymity, training, encouraging a non-punitive reporting culture and role expansion were highlighted as important factors that can affect the success of an incident reporting system.

Chapter 6 presents a qualitative systematic review to synthesise the qualitative evidence on HCPs' perceptions of IPC in the hospital setting, which was carried out due to the fact that communication was a common emerging theme across **Chapters 2**, **3** and **4**. Eighteen studies were identified as being eligible for inclusion in the review. Five descriptive themes emerged from the results of the identified studies i.e. *'Hierarchy'*, *'Interprofessional Ethos'*, *'Healthcare Environment'*, *'Personal Factors'* and *'Methods of Communication'*. The descriptive themes were synthesised into two analytical themes: '*Barriers to IPC'* and '*Facilitators to IPC'*. Each descriptive theme contributed to both analytical themes to some degree. A key finding of **Chapter 6** was the importance of personal factors in IPC. Personal factors such as positive personal relationships and an interprofessional ethos were both found to be facilitators of IPC, while organisational factors such as a negative work environment or a strong sense of hierarchy were found to inhibit IPC.

7.3 Interpretation and Implications of Findings

7.3.1 Safety Culture in the Irish Healthcare System

While studies on safety culture continue to be published in a variety of healthcare settings around the world, this thesis provides a unique contribution to the literature as it is the first in-depth investigation of the safety culture across a range of Irish healthcare organisations. **Chapters 2**, **3** and **4** present valuable insights into the experiences of HCPs in Ireland. The positive attitudes that Irish HCPs were found to have towards safety culture are in keeping with the findings of studies on safety culture in other Irish healthcare settings. A 2009 study by Relihan *et al.* and a 2018 study by Dwyer *et al*., in an AMAU and a neonatal unit respectively, found that staff in Irish healthcare organisations tended to have positive attitudes towards safety and teamwork, but had more negative perceptions of working conditions and management.[30,74] In a 2015 qualitative interview study with HCPs by Humphries *et al.*, study participants highlighted "*a general disrespect for health professionals in Ireland, from the media and also from health employers*", which they felt was evidenced by poor working conditions and vilification of HCPs in the media.[102] Similarly, a common finding across **Chapters 2**, **3** and **4** of this thesis was that Irish HCPs appear to trust themselves and their team members to provide safe care, but have less faith in the capabilities and intentions of healthcare administrators running and managing the healthcare organisation. Recent literature has shed a negative light on the Irish healthcare system and described the economic and social issues that have affected it in recent years. In his 2018 publication, Turner discussed how historic protracted underfunding, as well as the effects of the 2007 financial crisis, led to economic austerity that in turn led to severe healthcare cutbacks resulting in

overcrowding in Irish hospitals that persists to the present time. This is in spite of the fact the Ireland spends the fifth highest amount per capita on healthcare in the world.[79] Although overall expenditure on healthcare in Ireland is comparatively high among OECD countries, investment in clinical sites has been chronically deficient, particularly in the hospital sector. This has proved to be highly counterproductive to the creation and development of a working environment that facilitates a positive patient safety culture. In 2019, Humphries *et al*. described how poor conditions in Irish hospitals have contributed to a culture of medical migration, and in the same year Hayes *et al*. found that one third of Irish doctors experience burnout due to a suboptimal work environment.[78,135]

While the findings of **Chapters 2**, **3** and **4** of this thesis have contributed to the body of work on the challenging conditions in Irish healthcare, they have also revealed important insights about the people working in the Irish healthcare system. The HCPs who participated in this research appeared to be hardworking and dedicated and to maintain genuinely high standards of care for their patients. This is consistent with the finding of Hayes *et al.* that, despite poor working conditions, the majority of Irish physicians have a strong desire to practice medicine, and the finding of Humphries *et al.* that many HCPs who had emigrated for work in other healthcare systems had an intent or strong desire to return home and contribute to the Irish healthcare system.[78,102] This finding is of particular significance because a key feature across the many models for behaviour change that exist in the literature is the importance of motivation for change.[190,233] The results of **Chapters 2,3** and **4** suggest that an

initiative to improve patient safety, if designed in the context of the Irish healthcare system, could have a positive impact on patient safety and staff wellbeing.

7.3.2 Medication Incident Reporting

The extent of avoidable harm caused by medical error and MEs has been discussed at length throughout this thesis. For many years, reporting medication incidents has been advocated as a patient safety improvement strategy for healthcare systems worldwide.[3,5,75] However, the quantitative systematic review presented in **Chapter 5** identified only 17 studies that investigated the efficacy of interventions for improving medication incident reporting in hospitals, none of which were found to be of strong methodological quality (**Table 5.3**). It is logical therefore to expect that the introduction of an incident reporting system would increase the levels of reporting in a healthcare organisation. However, the review identified a lack of published research clarifying whether some reporting systems are more effective than others, as well as a lack of research on the key features of a successful ME reporting system. The most important factor to consider when attempting to improve incident reporting might not actually be the reporting system itself. As discussed in **Chapters 3** and **4**, a punitive culture can act as a significant obstacle to incident reporting in a healthcare organisation. In 1999, the '*To Err is Human*' policy document called for a greater focus on incident reporting in US healthcare.[3] In 2015, Mitchell *et al*. conducted a qualitative interview study with patient safety experts to investigate whether incident reporting had improved. A number of obstacles to incident reporting remained, including insufficient resources to analyse incident reports, lack

of engagement from medical staff and insufficient action in response to incident reports.[234] Similarly, a 2016 systematic review by Vrbnjak *et al.* found that the prevailing safety culture, the reporting system and management behaviour acted as barriers to nurses' reporting of ME and near misses.[111] These findings are consistent with the results of the qualitative interview study presented in **Chapter 4** of this thesis, in which HCPs commented on a lack of feedback or actions being taken in response to adverse incident reports, lack of knowledge on how to report an incident and a sense of futility regarding incident reporting.

7.3.3 Interprofessional Communication

The emergence of communication as a major theme in the qualitative interview study presented in **Chapter 4** prompted further investigation into the quality of IPC in hospital settings, in the form of the qualitative systematic review presented in **Chapter 6**. A key finding of that review was the significance of personal factors in maintaining effective IPC. Across the 18 identified studies, it was clear that IPC cannot function without mutual respect and understanding between HCPs as well as an appreciation of the role played by each colleague in patient care. This social aspect to IPC does not appear to have been fully recognised in other studies on the subject. Most tools designed to improve IPC, such as SBAR, have focussed on structured communication and aiding information transfer.[200] Instilling a strong interprofessional ethos amongst healthcare students and providing better opportunities for HCPs to appreciate the input of other professions could have a

positive impact on IPC and therefore on patient safety, and should therefore be a focus for future research.

The review's finding regarding the negative impact of hierarchy on IPC and collaboration is well recognized in the literature.[3,46,195,229] The presence of steep hierarchies in a healthcare environment can prevent HCPs from speaking up regarding patient safety risks which can lead to patient harm.[46,235] A number of studies have highlighted the importance of creating a healthcare environment in which staff of all disciplines feel comfortable speaking up when they have concerns about patient safety.[232,236,237] A 2011 report by Maxfield *et al.* described in detail the dangers of an inability to speak up in a healthcare setting and concluded that patient safety tools that warn against risks to patient safety are only effective if the HCP who becomes aware of the risk is able to speak up about it.[238] For this reason, a '*speaking up'* culture was identified as a potential focus for future research on improving patient safety in Irish healthcare.

7.4 Strengths and Limitations

One of the primary strengths of the research presented in this thesis is the mixed methods approach that was adopted to investigate safety culture in Irish healthcare organisations. The combination of quantitative and qualitative research methods has been found to be more insightful than when either method is used on its own.[85,86] The quantitative methods used in **Chapter 2** allowed safety culture to be compared between study sites and participant subgroups and also to compare the study sites to international healthcare organisations. The qualitative research methods used in **Chapters 3** and **4** further allowed improved understanding of the quantitative results of **Chapter 2** and provided a deeper insight into HCPs' perceptions of safety culture as well as valuable information that was used to inform future study design.

Another key strength of this thesis is the strong research foundation upon which the study chapters were based. The qualitative interview study presented in **Chapter 4** was reported in accordance with the COREQ checklist. The quantitative and qualitative systematic reviews presented in Chapters 5 and 6 which were designed based on the findings of **Chapters 2-4**, were conducted according to PRISMA guidelines and appropriate data synthesis, quality appraisal and reporting guidelines were adhered to throughout.[162,163,203–205] The quality of the research conducted as part of this thesis is reflected by the number of peer-reviewed academic papers and conferences abstracts that have been published as a result of this research. The six research studies presented in **Chapters 2-6** have all been published or are under consideration for publication in peer-reviewed journals.

Although there are numerous strengths associated with this thesis, there are also a number of limitations that must be acknowledged. The most significant limitation is that the original research plan could not completed fully. The final chapter in the original thesis plan was intended to present a study that used the TDF and BCW to design an intervention to improve medication incident reporting in Irish hospitals. The planned study was awarded a UCC interdisciplinary research grant and was accepted for publication as a conference abstract in the BMJ Quality and Safety. However, due to the coronavirus pandemic, the qualitative research aspect of the planned study could not be completed. Instead, it was decided to carry out a second systematic review to investigate HCPs' experiences on IPC in the hospital setting, which provided further insight into methods to improve patient safety culture in Irish healthcare.

A second important limitation is that this research was limited to a single geographical region of Ireland. The research presented in **Chapters 2**, **3** and **4** was carried out in the province of Munster in southwest Ireland, which may limit the generalisability and transferability of study findings. However, the structure of the healthcare systems in Munster is comparable to that throughout the Republic of Ireland, so the findings of this thesis could be applied to other healthcare settings in the country. Also, because of the range of healthcare settings included in this research, it is likely that the findings of this research will be reflective of the experiences of HCPs in other jurisdictions.

Finally, because of the data collection methods used in **Chapters 2**, **3** and **4** it is possible that selection bias was introduced to the research, which could have skewed the results. The survey used to collect data in **Chapters 2** and **3** was voluntary, as were the semi-structured interviews carried out in **Chapter 4.** Therefore, it is possible that only HCPs who already had an interest in patient safety took part or that the most overworked staff in the hospital were unable to participate. This could mean that the results of these chapters were not fully representative of all HCPs in the study sites and this possibility needs to be considered when interpreting these findings or conducting future research.

7.5 Recommendations for Future Research

This thesis presents novel insights into Irish HCPs' perceptions of safety culture, as well as potential methods to improve patient safety in Irish healthcare organisations. As such, it represents an excellent starting point upon which to base future research on safety culture in Irish and international healthcare, and on methods to improve patient safety. Future research should focus on the following areas:

- The results of **Chapter 5** could be used to inform the design of an intervention to improve medication incident reporting in Irish healthcare organisations. The TDF-based survey presented in **Appendix 9** should be carried out initially to determine the attitudes of Irish HCPs towards medication incident reporting. The results of the survey can be mapped onto the BCW to aid the selection of an intervention type or behaviour change method.
- Similarly, the results presented in **Chapter 6** could inform the design of an intervention to improve IPC. Because of the importance of '*speaking up*' culture in maintaining patient safety and because '*speaking up*' is a modifiable behaviour, the survey presented in **Appendix 12** should be used to assess HCP attitudes towards speaking up regarding patient safety. Once the BCW has been used to aid intervention design, a feasibility study could be carried out.
- Investigation of HCPs' perceptions of safety culture in healthcare organisations across the Republic of Ireland is a logical follow-on from this thesis. This should include using the SAQ to allow comparison with the results presented in this thesis, as well as the use of qualitative research methods,

through interviews or focus groups, to gain deeper insights into the experiences and views of HCPs nationwide.

- Further research on this topic in the community setting is also warranted. Investigations of safety culture in Irish primary care settings or community pharmacies could demonstrate as yet unknown and important problems in the safety culture of these healthcare settings. As the community pharmacy is a key area of frontline healthcare and the last stage at which medication incidents can be detected before reaching the patient, it follows that this would be an important area of focus for patient safety research in Ireland.
- The coronavirus pandemic has been exceedingly challenging for HCPs and has had a profound impact on the way that healthcare is delivered in Ireland. The use of the SAQ or qualitative research methods to investigate HCPs' perceptions of how the pandemic has affected healthcare and safety culture might reveal important insights into the experiences of frontline healthcare workers during the pandemic.

7.6 Conclusions

The overall aim of this thesis was to investigate patient safety culture in Irish healthcare organisations and to explore potential methods to improve patient safety in Irish healthcare. Through a mixed methods investigation, this research has provided valuable insights into the experiences of Irish HCPs in the context of a relatively under-resourced healthcare system. Study participants were found to have positive perceptions of the teamwork and commitment to patient safety in their clinical areas, although challenging working conditions and insufficient support from management presented obstacles to the provision of safe care to patients.

The findings of the early chapters of this thesis led to the conduction of two systematic reviews to investigate potential methods to improve patient safety in Irish healthcare. A quantitative systematic review of interventions to improve medication incident reporting in hospital identified reporting system format, reporting anonymity and the implementation of a non-punitive reporting structure as important factors in the design of a medication incident reporting system. A qualitative systematic review on HCPs' experiences of IPC highlighted the importance of both interpersonal and organisational factors and found that HCP hierarchies can act as a barrier to IPC.

The insights gained from this thesis provide direction for further study on patient safety, with two key research streams identified: medication incident reporting and IPC. This thesis makes three novel contributions to the literature on patient safety:

1) An insight into safety culture in Irish healthcare organisations,
2) A novel systematic review of interventions to improve medication incident reporting, and
3) A novel systematic review of HCPs' experiences of IPC.

This thesis provides a basis for further study on safety culture in Irish healthcare organisations and could be used as a guide for future research to improve patient safety and safety culture in healthcare organisations both in Ireland and abroad.

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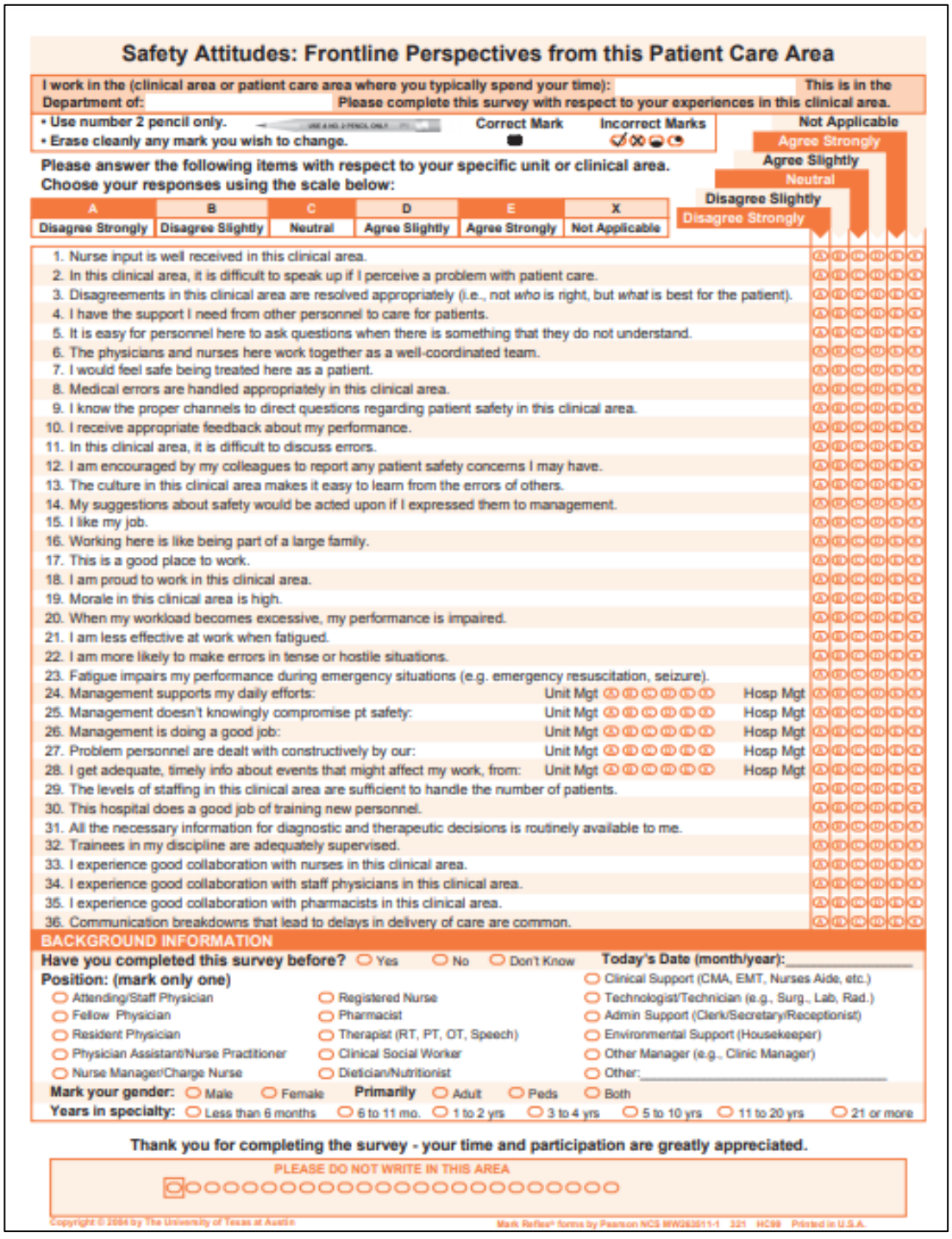
Appendices

Appendix 1: Short Form SAQ



Safety Attitudes: Frontline Perspectives from this Patient Care Area

I work in the (clinical area or patient care area where you typically spend your time): This is in the Department of: Please complete this survey with respect to your experiences in this clinical area.

- Use number 2 pencil only.
- Erase cleanly any mark you wish to change.

Correct Mark ● Incorrect Marks ✓ ⊗ ◒ ◔

Please answer the following items with respect to your specific unit or clinical area.
Choose your responses using the scale below:

A	B	C	D	E	X
Disagree Strongly	Disagree Slightly	Neutral	Agree Slightly	Agree Strongly	Not Applicable

	Disagree Strongly	Disagree Slightly	Neutral	Agree Slightly	Agree Strongly	Not Applicable
1. Nurse input is well received in this clinical area.	A	B	C	D	E	X
2. In this clinical area, it is difficult to speak up if I perceive a problem with patient care.	A	B	C	D	E	X
3. Disagreements in this clinical area are resolved appropriately (i.e., not *who* is right, but *what* is best for the patient).	A	B	C	D	E	X
4. I have the support I need from other personnel to care for patients.	A	B	C	D	E	X
5. It is easy for personnel here to ask questions when there is something that they do not understand.	A	B	C	D	E	X
6. The physicians and nurses here work together as a well-coordinated team.	A	B	C	D	E	X
7. I would feel safe being treated here as a patient.	A	B	C	D	E	X
8. Medical errors are handled appropriately in this clinical area.	A	B	C	D	E	X
9. I know the proper channels to direct questions regarding patient safety in this clinical area.	A	B	C	D	E	X
10. I receive appropriate feedback about my performance.	A	B	C	D	E	X
11. In this clinical area, it is difficult to discuss errors.	A	B	C	D	E	X
12. I am encouraged by my colleagues to report any patient safety concerns I may have.	A	B	C	D	E	X
13. The culture in this clinical area makes it easy to learn from the errors of others.	A	B	C	D	E	X
14. My suggestions about safety would be acted upon if I expressed them to management.	A	B	C	D	E	X
15. I like my job.	A	B	C	D	E	X
16. Working here is like being part of a large family.	A	B	C	D	E	X
17. This is a good place to work.	A	B	C	D	E	X
18. I am proud to work in this clinical area.	A	B	C	D	E	X
19. Morale in this clinical area is high.	A	B	C	D	E	X
20. When my workload becomes excessive, my performance is impaired.	A	B	C	D	E	X
21. I am less effective at work when fatigued.	A	B	C	D	E	X
22. I am more likely to make errors in tense or hostile situations.	A	B	C	D	E	X
23. Fatigue impairs my performance during emergency situations (e.g. emergency resuscitation, seizure).	A	B	C	D	E	X
24. Management supports my daily efforts: Unit Mgt	A	B	C	D	E	X
25. Management doesn't knowingly compromise pt safety: Unit Mgt	A	B	C	D	E	X
26. Management is doing a good job: Unit Mgt	A	B	C	D	E	X
27. Problem personnel are dealt with constructively by our: Unit Mgt	A	B	C	D	E	X
28. I get adequate, timely info about events that might affect my work, from: Unit Mgt	A	B	C	D	E	X
29. The levels of staffing in this clinical area are sufficient to handle the number of patients.	A	B	C	D	E	X
30. This hospital does a good job of training new personnel.	A	B	C	D	E	X
31. All the necessary information for diagnostic and therapeutic decisions is routinely available to me.	A	B	C	D	E	X
32. Trainees in my discipline are adequately supervised.	A	B	C	D	E	X
33. I experience good collaboration with nurses in this clinical area.	A	B	C	D	E	X
34. I experience good collaboration with staff physicians in this clinical area.	A	B	C	D	E	X
35. I experience good collaboration with pharmacists in this clinical area.	A	B	C	D	E	X
36. Communication breakdowns that lead to delays in delivery of care are common.	A	B	C	D	E	X

Hosp Mgt

BACKGROUND INFORMATION

Have you completed this survey before? Yes No Don't Know Today's Date (month/year): _____

Position: (mark only one)

- Attending/Staff Physician
- Fellow Physician
- Resident Physician
- Physician Assistant/Nurse Practitioner
- Nurse Manager/Charge Nurse
- Registered Nurse
- Pharmacist
- Therapist (RT, PT, OT, Speech)
- Clinical Social Worker
- Dietician/Nutritionist
- Clinical Support (CMA, EMT, Nurses Aide, etc.)
- Technologist/Technician (e.g., Surg., Lab, Rad.)
- Admin Support (Clerk/Secretary/Receptionist)
- Environmental Support (Housekeeper)
- Other Manager (e.g., Clinic Manager)
- Other: _____

Mark your gender: Male Female Primarily Adult Peds Both

Years in specialty: Less than 6 months 6 to 11 mo. 1 to 2 yrs 3 to 4 yrs 5 to 10 yrs 11 to 20 yrs 21 or more

Thank you for completing the survey - your time and participation are greatly appreciated.

PLEASE DO NOT WRITE IN THIS AREA

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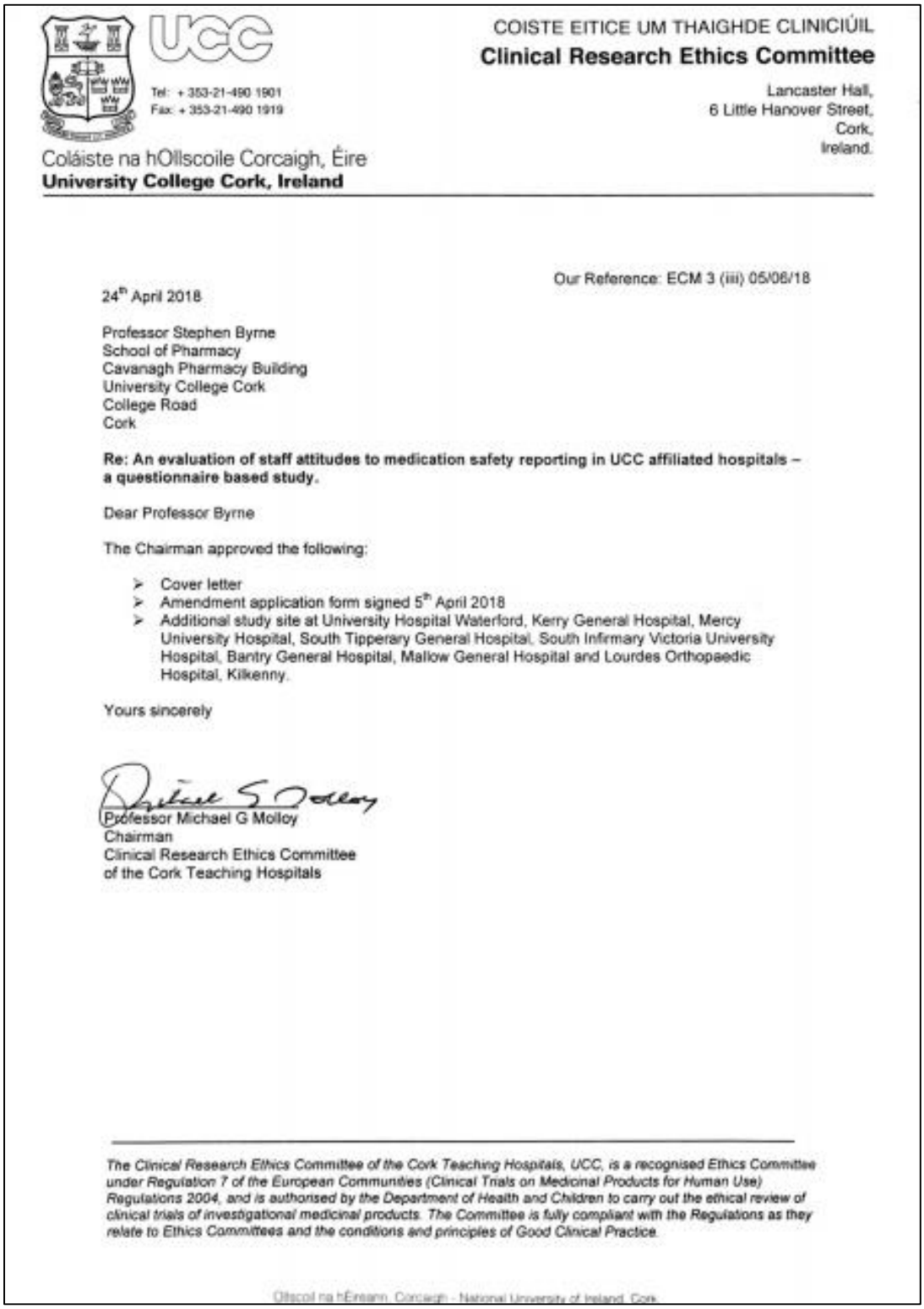
Mark Reflex® forms by Pearson NCS MW263011-1 321 HC99 Printed in U.S.A.

Appendix 2: Ethical Approval for SAQ Study



Tel: + 353-21-490 1901
Fax: + 353-21-490 1919

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee

Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Our Reference: ECM 3 (iii) 05/06/18

24th April 2018

Professor Stephen Byrne
School of Pharmacy
Cavanagh Pharmacy Building
University College Cork
College Road
Cork

Re: An evaluation of staff attitudes to medication safety reporting in UCC affiliated hospitals – a questionnaire based study.

Dear Professor Byrne

The Chairman approved the following:

- Cover letter
- Amendment application form signed 5th April 2018
- Additional study site at University Hospital Waterford, Kerry General Hospital, Mercy University Hospital, South Tipperary General Hospital, South Infirmary Victoria University Hospital, Bantry General Hospital, Mallow General Hospital and Lourdes Orthopaedic Hospital, Kilkenny.

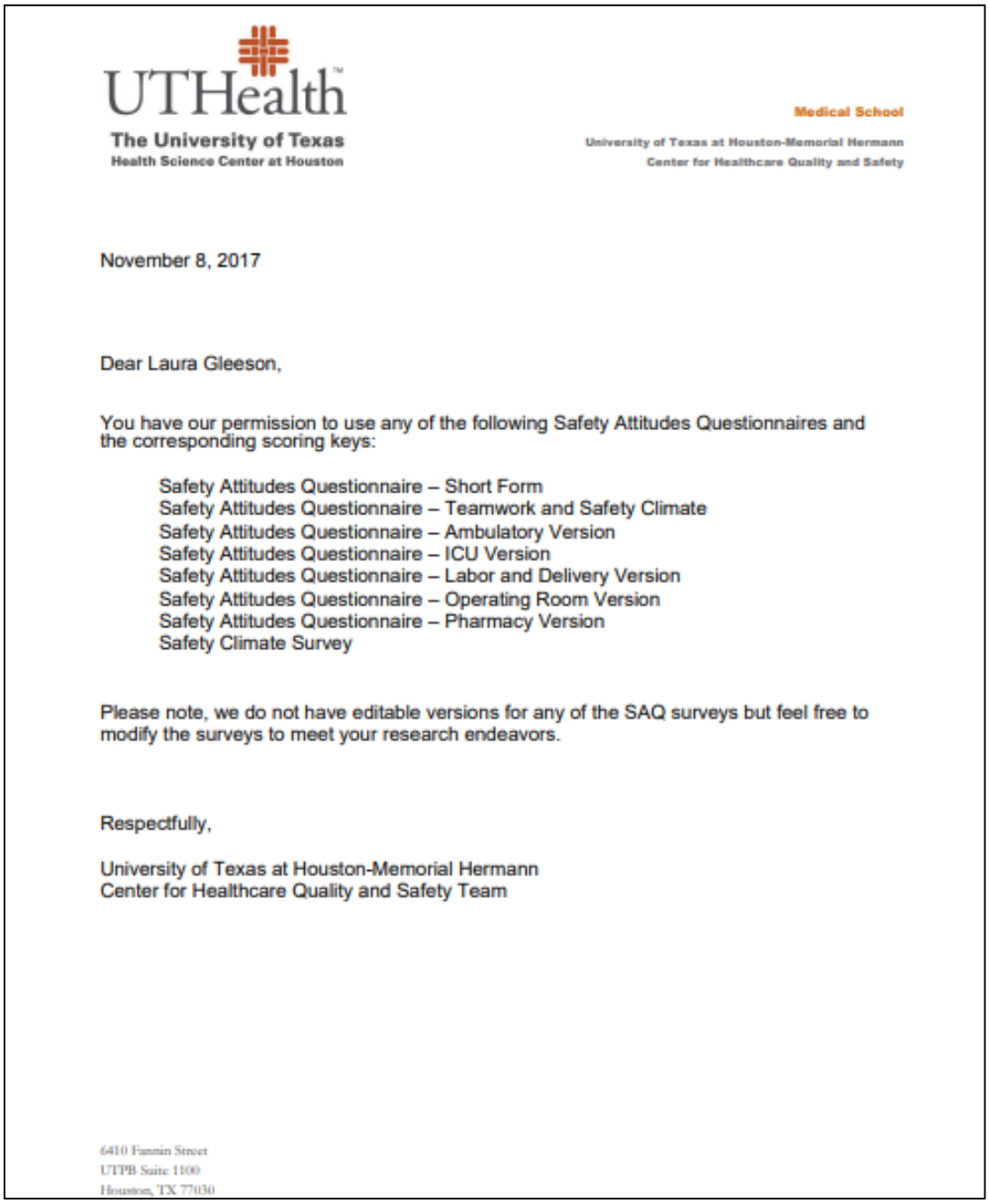
Yours sincerely

Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

Ollscoil na hÉireann, Corcaigh - National University of Ireland, Cork

Appendix 3: SAQ Permission Letter



UTHealth
The University of Texas
Health Science Center at Houston

Medical School
University of Texas at Houston-Memorial Hermann
Center for Healthcare Quality and Safety

November 8, 2017

Dear Laura Gleeson,

You have our permission to use any of the following Safety Attitudes Questionnaires and the corresponding scoring keys:

Safety Attitudes Questionnaire – Short Form
Safety Attitudes Questionnaire – Teamwork and Safety Climate
Safety Attitudes Questionnaire – Ambulatory Version
Safety Attitudes Questionnaire – ICU Version
Safety Attitudes Questionnaire – Labor and Delivery Version
Safety Attitudes Questionnaire – Operating Room Version
Safety Attitudes Questionnaire – Pharmacy Version
Safety Climate Survey

Please note, we do not have editable versions for any of the SAQ surveys but feel free to modify the surveys to meet your research endeavors.

Respectfully,

University of Texas at Houston-Memorial Hermann
Center for Healthcare Quality and Safety Team

6410 Fannin Street
UTPB Suite 1100
Houston, TX 77030

Appendix 4: COREQ Checklist for Qualitative Interview Study

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

Appendix 5: Ethical Approval for Qualitative Interview Study

COISTE EITICE UM THAIGHDE CLINICIÚIL

Clinical Research Ethics Committee of the Cork Teaching Hospitals

Tel: +353-21-4901901
Email: crec@ucc.ie

University College Cork
Lancaster Hall
6 Little Hanover Street
Cork
Ireland

CREC Review Reference Number: ECM 4 (n) 06/11/18

Date: 1st November 2018

Professor Stephen Byrne
School of Pharmacy
Cavanagh Pharmacy Building
Room 1.02
College Road
University College Cork

Study Title: Safety culture in the care of multi-morbid older hospitalized adults.

Approval is granted to carry out the above study at:

Cork University Hospital

The following documents have been approved:

Document	Approved	Version	Date
Cover Letter	Yes		18/09/18
Application Form	Yes		18/09/18
CV for Chief Investigator	None		*Please forward a copy for this study file.*
Evidence of Insurance	Yes		
Study Protocol	Yes		
PIL/Consent Form	Yes	1	11/09/18
Invitation Letter	None		
Interview Guide	Yes	1	11/09/18

We note that the co-investigator(s) involved in this project will be:

Name	Occupation
Laura Gleeson	Research Pharmacist
Aoife Delaney	Medication Safety Pharmacist

Full approval is now granted to carry out the above study.

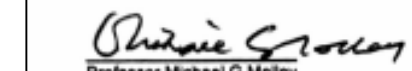
The date of this letter is the date of authorization of the study.

Please keep a copy of this signed approval letter in your study master file for audit purposes.

You should note that ethical approval will lapse if you do not adhere to the following conditions:

1. Submission of an Annual Progress Report/Annual Renewal Survey (due annually from the date of this approval letter)
2. Report unexpected adverse events, serious adverse events or any event that may affect ethical acceptability of the study
3. Submit any change to study documentation (minor or major) to CREC for review and approval. Amendments must be submitted on an amendment application form and revised study documents must clearly highlight the changes and contain a new version number and date. Amendments cannot be implemented without written approval from CREC.
4. Notify CREC of discontinuation of the study
5. Submit an End of Trial Declaration Form and Final Study Report/Study Synopsis when the study has been completed.

Yours sincerely



Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

Appendix 6: PRISMA Statement for Quantitative Systematic Review

Section/topic	#	Checklist item
TITLE		
Title	1	Identify the report as a systematic review, meta-analysis, or both.
ABSTRACT		
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.
INTRODUCTION		
Rationale	3	Describe the rationale for the review in the context of what is already known.
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).
METHODS		
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.

Section/topic	#	Checklist item
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.
RESULTS		
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).
DISCUSSION		
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).

Section/topic	#	Checklist item
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.
FUNDING		
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: **www.prisma-statement.org**.

Appendix 7: Sampling Framework for Qualitative Interview Study

		Profession			
		Physician	**Nurse**	**HSCP**	***Total***
Gender	**Male**	4	1	2	*7*
	Female	1	5	4	*10*
	Total	*5*	*6*	*6*	
Work Experience	**≥10 Years**	2	3	3	8
	5-10 Years	1	2	0	*3*
	≤5 Years	2	1	3	*6*
	Total	5	6	6	

Appendix 8: Search Strategy for Quantitative Systematic Review

Keywords
Medication error, reporting, hospital
PubMed Search Strategy
(Medication error (MeSH) OR Inappropriate prescribing OR inappropriate medication OR preventable adverse drug event* OR preventable adverse drug reaction* OR prescribing error* OR transcription error* OR medication discrepanc* OR medication omission* OR administration error* OR near miss OR drug error) AND (Report* OR disclos* OR monitor* OR surveillance OR record*) AND (Hospital (MeSH) OR Inpatient (MeSH) OR tertiary care (MeSH) OR tertiary care centre (MeSH) OR secondary care (MeSH) OR secondary care centre (MeSH))
Embase Search Strategy
(report*:ab,ti OR disclos*:ab,ti OR monitor*:ab,ti OR 'surveillance':ab,ti OR record*:ab,ti) AND [humans]/lim AND ('medication error':ab,ti OR 'inappropriate medication':ab,ti OR (prescribing AND error*:ab,ti) OR (transcription AND error*:ab,ti) OR (medicationand AND discrep*:ab,ti) OR (medication AND omission*:ab,ti) OR (administrationand AND error*:ab,ti) OR (near AND miss*:ab,ti) OR (drug:ab,ti AND error*:ab,ti)) AND [humans]/lim AND ('hospital':ab,ti OR 'hospital patient':ab,ti) AND [humans]/lim
Web of Science Search Strategy
(Medication error OR Inappropriate prescribing OR inappropriate medication OR preventable adverse drug event* OR preventable adverse drug reaction* OR prescribing error* OR transcription error* OR medication discrepanc* OR medication omission* OR administration error* OR 'near' miss OR drug error)
AND
(Report* OR disclos* OR monitor* OR surveillance OR record*)
AND

(Hospital OR Inpatient OR tertiary care OR tertiary care centre OR secondary care OR secondary care centre)
Medline (Ovid) and CINAHL Search Strategies
(Medication error OR Inappropriate prescribing OR inappropriate medication OR preventable adverse drug event* OR preventable adverse drug reaction* OR prescribing error* OR transcription error* OR medication discrepanc* OR medication omission* OR administration error* OR 'near' miss OR drug error)
AND
(Report* OR disclos* OR monitor* OR surveillance OR record*)
AND
(Hospital OR Inpatient OR tertiary care OR tertiary care centre OR secondary care OR secondary care centre)
Abstract only, humans

Appendix 9: Medication Incident Reporting Attitudes Survey

Medication Incident Reporting Attitudes Survey					
Please tick the appropriate response.	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I know how to report a medication safety incident if it occurs.					
I intend to report the next medication safety incident I witness/observe.					
Reporting medication safety incidents when they occur:					
• is part of my job.					
• is an important part of my job.					
• is my responsibility.					
• is the responsibility of other members of the multidisciplinary team.					
• is supported by this hospital.					
I believe that reporting medication safety incidents when they occur:					
• may prevent future similar medication safety incidents.					
• will support patient safety.					
• will have benefits that outweigh the time and effort involved in completing the report					

• will be received positively by hospital management					
• will not have negative consequences for me					
Please tick the appropriate response.	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I want to feel comfortable reporting medication incidents.					
I can decide when it is an appropriate time to report a medication incident.					
The environment in this clinical area makes it easy to report a medication incident.					
The social norms in this clinical area make it easy to report a medication incident.					
I am aware of times in the past when I have not reported a medication incident.					

Appendix 10: Search Strategy for Qualitative Systematic Review

Keywords
Interprofessional, communication, hospital, qualitative
PubMed Search Strategy
(interprofessional OR interdisciplinary OR multidisciplinary)
AND
(communication)
AND
(Hospital OR Inpatient OR tertiary care OR tertiary care centre OR secondary care OR secondary care centre)
AND
(qualitative OR experience OR perception)
Filters: Humans, English language from 2000 – 2020
CINAHL Search Strategy
(interprofessional OR interdisciplinary OR multidisciplinary)
AND
(communication)
AND
(Hospital OR Inpatient OR tertiary care OR tertiary care centre OR secondary care OR secondary care centre)
AND
(qualitative OR experience OR perception)
Filters: Humans, English language, from 2000 – 2020
Web of Science Search Strategy
(TI=interprofessional OR TI=interdisciplinary OR TI=multidisciplinary OR TS= interprofessional OR TS=interdisciplinary OR TS=multidisciplinary)
AND
(TI=communication OR TS=communication)

AND
(TI=Hospital OR TI= Inpatient OR TI=tertiary care OR TI=tertiary care centre OR TI=secondary care OR TI=secondary care centre OR TS=Hospital OR TS=Inpatient OR TS=tertiary care OR TS=tertiary care centre OR TS=secondary care OR TS=secondary care centre)
AND
(TI=qualitative OR TI=experience OR TI=perception OR TS=qualitative OR TS=experience OR TS=perception)
Filters: English language, from 2000-2020
Embase Search Strategy
('interprofessional'/exp OR interprofessional OR interdisciplinary OR multidisciplinary)
AND
'communication'/exp
AND
(hospital OR inpatient OR 'tertiary care' OR 'tertiary care centre' OR 'secondary care' OR 'secondary care centre')
AND
(qualitative OR experience OR perception)
Filters: Humans, English language, 2000-2020

Appendix 11: ENTREQ Statement for Qualitative Systematic Review

Item	Guide and Description
Aim	State the research question the synthesis addresses.
Synthesis Methodology	Identify the synthesis methodology or theoretical framework which underpins the synthesis, and describe the rationale for choice of methodology
Approach to Searching	Indicate whether the search was pre-planned or iterative
Inclusion Criteria	Specify the inclusion/exclusion criteria
Data Sources	Describe the information sources used and when the searches conducted; provide the rationale for using the data sources.
Electronic Search Strategy	Describe the literature search
Study Screening Methods	Describe the process of study screening and sifting
Study Characteristics	Present the characteristics of the included studies
Study Selection Results	Identify the number of studies screened and provide reasons for study exclusion
Rationale for Appraisal	Describe the rationale and approach used to appraise the included studies or selected findings
Appraisal Items	State the tools, frameworks and criteria used to appraise the studies or selected findings
Appraisal Process	Indicate whether the appraisal was conducted independently by more than one reviewer and if consensus was required.
Appraisal Results	Present results of the quality assessment and indicate which articles, if any, were weighted/excluded based on the assessment and give the rationale
Data Extraction	Indicate which sections of the primary studies were analysed and how were the data extracted from the primary studies?
Software	State the computer software used, if any

Number of Reviewers	Identify who was involved in coding and analysis
Coding	Describe the process for coding of data
Study Comparison	Describe how were comparisons made within and across studies
Derivation of Themes	Explain whether the process of deriving the themes or constructs was inductive or deductive
Quotations	Provide quotations from the primary studies to illustrate themes/constructs, and identify whether the quotations were participant quotations of the author's interpretation.
Synthesis Output	Present rich, compelling and useful results that go beyond a summary of the primary studies

Appendix 12: Attitudes towards 'Speaking Up' Survey

Attitudes towards 'Speaking Up' Survey					
Please tick the appropriate response.	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I have the knowledge to identify a risk to patient safety when it occurs.					
I have the communication/interpersonal skills to speak up regarding a risk to patient safety if it occurs.					
Speaking up about patient safety risks when they occur:					
• is part of my job.					
• is an important part of my job.					
• is my responsibility.					
• is the responsibility of other members of the multidisciplinary team.					
• is supported by this hospital.					
I believe that speaking up about patient safety risks when they occur:					
• may prevent future similar incidents.					
• will support patient safety.					
• will have benefits that outweigh the risks.					
• will be supported by hospital management.					
• will not have negative					

consequences for me.					
I associate the following emotions with speaking up about patient safety:					
• Fear					
• Anxiety					
• Stress					
Please tick the appropriate response.	**Strongly Disagree**	**Slightly Disagree**	**Neutral**	**Slightly Agree**	**Strongly Agree**
I intend to speak up next time I am concerned about a risk to patient safety.					
I want to feel comfortable speaking up about patient safety risks.					
I can decide when it is an appropriate time to speak up about patient safety.					
The environment in this clinical area makes it easy to speak up about patient safety.					
The social norms in this clinical area make it easy to speak up about patient safety.					
I am aware of times in the past when I have not spoken up about patient safety.					